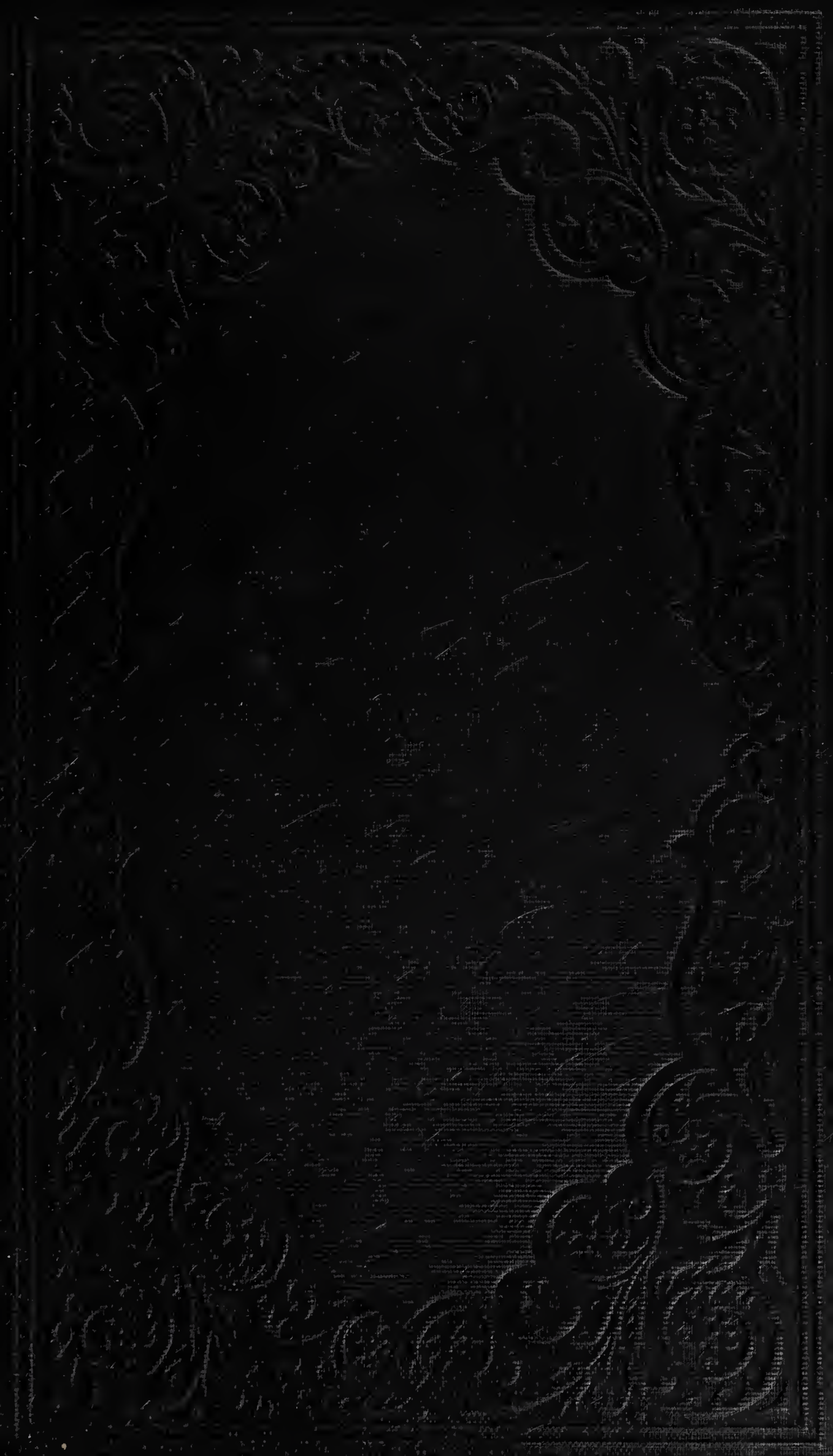
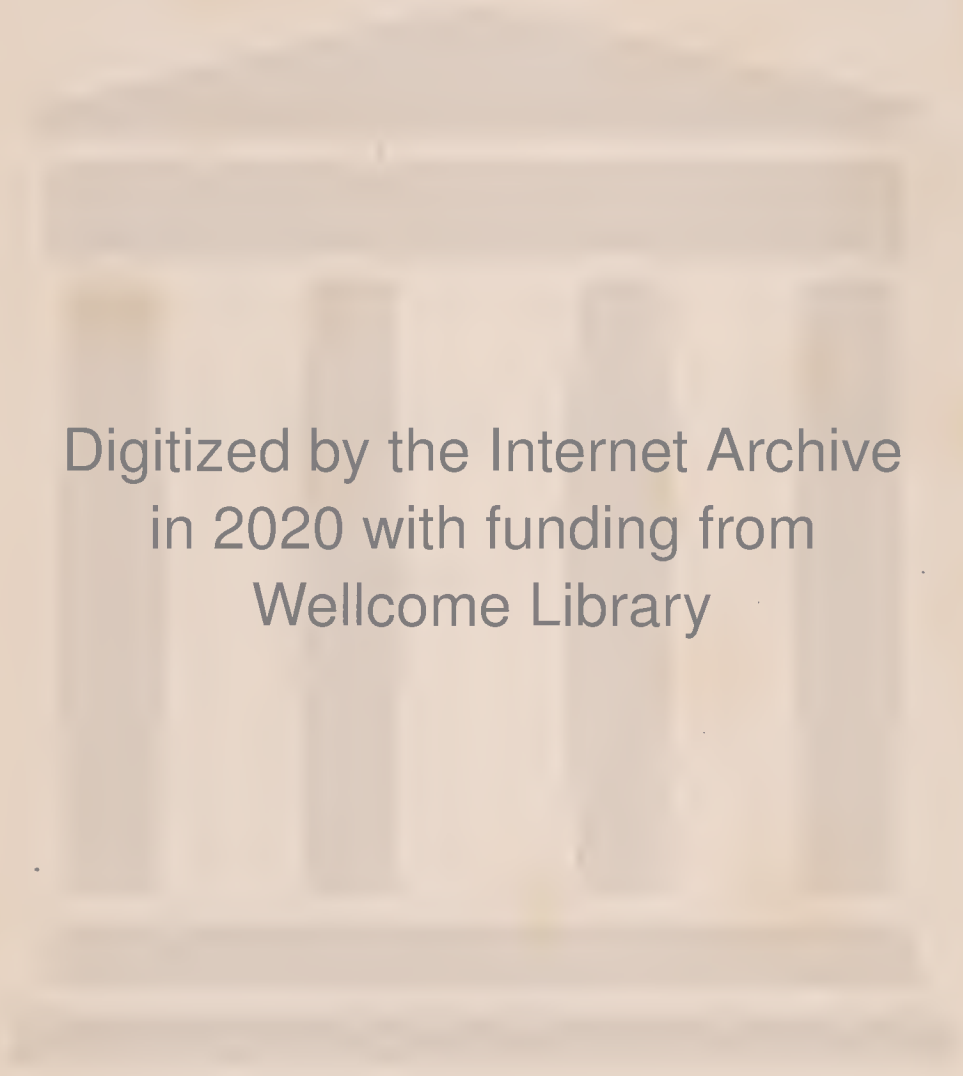


EXETER
QUEEN ST.
DISPENSARY

# BRAITHWAITE'S RETROSPECT.

VOL. LXXXIV. JULY—DECEMBER, 1881.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EXETER
QUEEN ST
DISPENSARY

THE

# RETROSPECT OF MEDICINE:

BEING

## A HALF-YEARLY JOURNAL

CONTAINING A RETROSPECTIVE VIEW OF EVERY DISCOVERY AND PRACTICAL IMPROVEMENT IN THE MEDICAL SCIENCES.

EDITED BY

W. BRAITHWAITE, M.D.

LATE LECTURER ON MIDWIFERY AND THE DISEASES OF WOMEN AND CHILDREN AT THE LEEDS SCHOOL OF MEDICINE, ETC.

AND

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AN ABSTRACT OF THE MOST PRACTICAL ARTICLES IN THIS VOLUME, WITH OTHER SHORT ARTICLES FROM THE MEDICAL JOURNALS, SHOWING THE MOST IMPORTANT INDICATIONS OF TREATMENT PUBLISHED BY DIFFERENT WRITERS DURING THE HALF-YEAR. ARRANGED ALPHABETICALLY.

## AFFECTIONS OF THE SYSTEM GENERALLY.

ACUTE FEVERS.—*Periods of Infection.*—The Forfarshire Medical Association having considered the desirability of promoting uniformity of practice amongst its members in their management of the infectious fevers, with respect to the period of time during which quarantine precautions should be maintained, recommends as follows:—"When an infectious fever has appeared in one or more members of a household, other members who may have been exposed to the chance of infection by intercourse with them, or otherwise, should not be removed to a household where there are others liable to be infected until the expiry of the period of incubation shows that they have escaped. Without going to extremes, the period of incubation may, for practical purposes, be considered to be—for small-pox, typhus, hooping cough, measles, fourteen days; and scarlet fever and diphtheria, ten days." That convalescents from these fevers should be considered as still liable to give off infection until the expiry of a period of time, counting from the beginning of the illness, ranging for each fever as stated below:—Hooping cough eight weeks; Scarlet fever seven weeks; Measles six weeks; Diphtheria six weeks; Typhus four weeks; Small-pox fourteen days after disappearance of scabs. (Glasgow Medical Journal, Sept., p. 193.)

CANCER.—*Influence of Constitutional Drains upon its Development.*—The frequent appearance of cancer in women at a time of life coincident with the withdrawal of a discharge has a significance when coupled with somewhat analogous circumstances. Of the various plans of treatment that have been adopted with the view of preventing the recurrence of cancer, that of setons and issues will be found to afford the most promising results. Writing upon this subject, the late Mr. C. H. Moore remarks (Holmes's System of Surgery) "a greater good may be asserted to have attended the establishment of

a slight drain from some part of the surface which is near enough to influence the locality of the disease, *without itself being liable to taint*. The existing evidence appears sufficient to warrant the insertion of a seton beneath the shoulder, after the patient has recovered from the effects of the operation of removing a scirrhous mamma." (Mr. Reginald Harrison, p. 29.)

*Chian Turpentine*.—Chian turpentine is thoroughly useless as a remedy for cancer, whether of the female generative organs or of other parts. It was administered during several months to several women suffering from uterine cancer. It was not found to check the progress of the cancer, which in spite of it continued its fatal course. In not one instance did the vaginal discharge assume the thick ropy character mentioned by Prof. Clay. As a reputed anodyne it quite failed to lull pain, and during its use opium was found indispensable. With respect to its alleged hæmostatic powers, hemorrhages occurred as frequently and as copiously in women whilst taking the turpentine as in others to whom it was not given. (Mr. J. W. Hulke, p. 32).

Disinfectants.—*Nitrous Acid*.—In advocating aerial disinfectants it must be distinctly understood that, as ordinarily practised in the sick room, they are positively useless. To place carbolic acid or permanganate of potassium in solution in small quantities in a saucer in the corner of a room is utterly worthless, so far as any effect it produces on specific contagia; the quantity diffused being wholly inadequate to the object in view. Aerial disinfection, when resorted to, must be carried out in its minutest details just as carefully as when we are dealing with liquid disinfectants, and the proportions of the agent used and the size of the room it is proposed to submit to its action carefully balanced, so as to ensure destruction of the poison. Of all the agents recommended I found nitrous acid by far the most effective. The following experiment was repeated several times, and gave the same results each time: Two ounces of copper wire, which was well cleaned, were treated with 50 cubic centimetres of concentrated nitric acid, in a chamber with a cubic capacity of 53 feet, yielding however only 0·35 per cent. of nitrous acid. A saucer containing 100 cubic centimetres of decomposing infusion of beef, full of active bacteria, was placed in the chamber with the nitric acid and copper-wire mixture, and the effect was most decided, reducing the activity of the bacteria, while the fluid was rendered strongly acid. The same preparation after 48 hours, examined microscopically, showed still a diminished activity. The bacteria were largely precipitated, and the fluid was free from all putrefactive

odour. The fluid in another test-saucer, on the other hand, was opaque and clouded with active bacteria, the putrefactive odour being very offensive. Examination on the third day showed still no tendency to the further development of bacteria, and the fluid remained quite inodorous. The test-saucer having been introduced into the chamber, with a further addition of 35 cubic centimetres of strong nitric acid, gave evidence of considerable improvement after the lapse of 48 hours, and, no doubt, would have been quite corrected by a further exposure to the nitrous acid fumes. Both these infusions examined after the lapse of a week showed no change for the worse. These experiments clearly prove that in nitrous acid we have a chemical agent which will arrest the development and further reproduction of septic microzymes, and which is therefore capable of destroying contagion. (Dr. J. Lane Notter, Dublin Journal of Med. Science, June, p. 508).

Typhoid Fever.—*Eucalyptus Globulus.*—The drug possesses *antiseptic* qualities; it acts, as we have seen, beneficially upon the lining membrane of the stomach, perhaps of the duodenum. The characteristic lesion to be chiefly dreaded in typhoid fever is an irritated condition, a congestion, an inflammation, passing into ulcers or sloughs of the small follicular glands of the intestinal canal. Ever since venturing to make the suggestion referred to, I have kept it in view, prescribing a teaspoonful of the tincture of *eucalyptus*, well diluted, at regular intervals of three or four hours, in all the cases of typhoid fever which have occurred. My distinct impression is that, as a rule, the duration of the disease has been shortened, and the tendency to diarrhœa diminished. If mixed with a large wineglassful of water, the medicine is far from disagreeable to the patient, and may be steadily administered in the interval of nourishment without becoming irksome. By food, I mean milk and lime-water. As each dose of the tincture contains a drachm of spirits of wine, it is worthy of consideration that we are, in fact, giving a slight stimulant, not only well diluted, but possessed of a medicative property at the same time. This may therefore come in lieu of those other stimulants so often deemed desirable, at least in the advanced stages of the fever, while, in the intervals of the bland milky nutriment, it will be brought into immediate contact, as an antiseptic, with the seat of threatened ulceration and sloughing. (Mr. Benjamin Bell, p. 28.)

Zymotic Diseases.—*The Antiseptic Treatment.* — Antiseptic treatment may be the true and rational corollary to the highly probable germ theory of infectious disease. Granted the

germ theory to be true, it seemed to me to follow as naturally in medicine as in surgery, that the proper course to adopt was to kill the germs, or, if that be impossible without serious results to the patient, at all events to lower their vitality. Recently a German physician has treated typhoid fever antiseptically with good results; and equally favourable has been the subcutaneous injection of solution of benzoate of soda in yellow fever, where the multiplication of germs in the blood has been demonstrated to occur, thus adding another factor to the induction proving the germ theory. As yet I have not felt quite confident enough to quit the apronstrings of Mindererus, but have given the glycerine of carbolic acid in combination. Six cases have been so treated thus far—two with copious rash and pretty severe sore throat. The dose given was one minim of the acid every four hours in one of the two, a young man of 19; a quarter to half a minim in the other cases, children. All have done perfectly well. Now, what I have said by no means proves that carbolic acid is a remedy for scarlatina: long experience and strict investigation alone will do that; but, theoretically, it is good, and practically, I have shown that carbolic acid may be safely given to scarlatinal patients. Thus there is a starting-point for further research. There is the fact to help us in selecting this as the scarlatinal antiseptic, that it has proved of some benefit in the, in some respects, analogous general exfoliative dermatitis. The variety of germs must necessarily be as great as that of the zymotics themselves, but there is also a variety of antiseptics as great as the variety of germs. We carefully attempt to destroy the germs in the air of the sick-room and discharges of the patients by disinfectants. Why not thus attempt their destruction in the body of the patient? (Dr. A. D. Macdonald, Edinburgh Med. Jour., Sept., p. 232.)

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## AFFECTIONS OF THE NERVOUS SYSTEM.

ELECTRO-DIAGNOSIS.—The diagnostic powers of electricity are largely used by those specially engaged in the treatment of diseases of the nervous system; but, owing to an exaggerated estimation of the technical skill required for its practice, electro-diagnosis has not yet received the general attention due to its importance. For the practice of ordinary electro-diagnosis, the disk electrodes, supplied with medical batteries, suffice; much more delicate reactions, however, may be obtained by the use of small olivary electrodes furnished with current-interruptors, by which the circuit can be closed and opened without changing the position of the electrodes. A pedal interruptor is a convenient accessory for producing

slow interruptions with the induction apparatus. The following conditions are to be observed. The patient should be placed in a well diffused light; the limbs under observation should be arranged symmetrically, in an unconstrained position; and the patient should allow the muscles to be perfectly passive. If the paralysis be unilateral, care should be taken to apply the current equally to the two sides, both as regards strength and localisation. As an illustration of the method employed in the practice of electrodiagnosis in its simplest form, take a case of infantile paralysis of one limb—say, the arm—a few weeks after the subsidence of the acute stage. Place a flat disk electrode, connected with one battery terminal, on the cervical spine, and fix it there. To the other battery terminal, by means of a double or branched conducting cord, attach two small electrodes, with current-interruptors; and, having selected a muscle, place the electrodes on corresponding points on the two arms. See that the electrode covers are well moistened with water, acidulated with a few drops of acetic acid; and, if the skin be very dry, pass over the arms and neck a sponge squeezed out of hot water. Let an induced current first be used. Complete the circuit with the interruptor on the sound arm, and gradually increase the current-strength until a well-marked contraction is produced; now, try the effect on the paralysed limb: there is no response. If the current-strength be increased to the highest bearable limit, and the interruptions be made to succeed each other very slowly, still there is no manifestation of faradic irritability. Change the induced for the constant current; commence with the paralysed limb; and, by means of the battery commutator, make the electrodes applied to the arms alternately positive and negative; add cell after cell, opening and closing the circuit, with the interruptor, several times after each addition to the current-strength, until a slight muscular contraction is seen. (Dr. J. Dixon Mann, p. 342.)

Belladonna Poisoning.—*Pilocarpin.*—The patient had taken at 9 p.m., in mistake, ℥ ii. ʒ ii. of lin. belladonna (B.P.). There being no decided improvement in her condition I determined to try pilocarpin; this I procured at 3 a.m. and subcutaneously injected one-fifth of a grain every fifteen minutes. After the third dose there was a marked improvement; consciousness was evidently returning, her countenance became more natural, her pulse could be distinctly felt, and she was able to raise her hands to her mouth and throat. At 3.45 I administered a fourth dose of one-fifth of a grain; this had a decided effect on both pupils, which began to contract under the influence of light; she was evidently fast recovering; had a drink of tea and milk and was able to speak. (Mr. Nicholas Grattan, p. 345.)

HEADACHE.—The following recipes have been collected by a writer in the Boston Journal of Chemistry from a variety of trustworthy sources:—Two grains of citrate of caffein, in capsule, taken every half hour, is a very effectual remedy in nervous and sick headache. One or two doses are often sufficient to give complete relief. The only objection to its use is the sleeplessness which sometimes results if it is taken in the evening. It is preferable to guarana as being hardly ever rejected by the stomach. The following, according to Dr. W. W. Carpenter, is very effectual in most forms of headache: Muriate of ammonia, three drams; acetate of morphia, one grain; citrate of caffein, thirty grains; aromatic spirits of ammonia, one dram; elixir of guarana, four ounces; rose-water, four ounces. Mix. Dessertspoonful every ten or twelve minutes. In nervous headache, Dr. W. A. Hammond states the value of various drugs as follows: Oxide of zinc is of great value. Ordinary dose two grains, three times a day, after meals; maximum dose, five grains. It is best given in form of pills. Nux vomica is preferable to strychnia. The dose is one-fourth grain after meals. If the patient be chlorotic, it is well to combine a grain of reduced iron and half a grain sulphate of quinine. Bismuth, in the form of subcarbonate, will often take the place of oxide of zinc. Dose, two grains after each meal. Bismuth probably aids digestion more than any mineral tonic, and is of use when there is gastric disturbance. The bromides are serviceable when the nervous system has been irritated; when it is exhausted they do harm. Phosphorus is very useful in most forms of nervous headache. The best results are obtained from dilute phosphoric acid, in doses of thirty drops, largely diluted, three times a day, after eating; or phosphide of zinc, one-tenth grain, in pill, three times a day. (Practitioner, May, p. 376.)

LOCOMOTOR ATAXY.—*Nerve-Stretching.*—In a case of locomotor ataxy, while the patient was under the influence of ether, Mr. Marshall cut down upon the great sciatic nerve in the middle third of the right thigh, and stretched it with his finger. With the nerve between his thumb and forefinger, he pulled it upwards from below twice, and afterwards from above downwards twice, making the nerve stand out like a tense thick cord in the buttock. The nerve was raised between one and two inches from the level of the skin, and four or five from its bed. The wound was dressed antiseptically. There was scarcely any shock during the operation, the pulse remaining of good quality, and about 100 per minute. The patient was put to bed; and, when he re-

covered from the ether, he could move his right ankle and toes, there being no motor paralysis of that leg, and no anæsthesia. About two hours after the operation, he complained of being chilly. The temperature was 98·4°; pulse 102, very small and compressible. Hot bottles were applied to his feet, which were very cold, but not one more than the other; and two drachms of brandy ordered every two hours. The patient had one dose; and at 8 p.m., five hours after the operation, was very comfortable, complaining of no pain anywhere in the leg or back. The permanent gain was but trifling. (Dr. H. C. Bastian, p. 61.)

Loss of the Sense of Smell. — There are two medicines which have a decided and antagonistic influence on olfaction —strychnia will exalt, while morphia will impair and deaden it. Strychnia applied locally to the mucous membrane of the nose as a snuff, or taken internally in a suitable dose, wonderfully increases the keenness of the sense, the local application being the more effective of the two. Smaller quantities of scents are perceived, and their impression is more precise and pleasant. The sensitiveness to pungent odours is so much increased that snuff, ammonia, and acetic acid cause positive pain. It therefore appears that the excitability of the fifth nerve is likewise exalted. Morphia, on the other hand, has only insignificant effects when applied as a snuff; but if taken internally, and more especially if injected subcutaneously, confuses the appreciation of odours to such an extent as to produce a kind of chaos. Smell is not actually destroyed, but the odours appear, as it were, at an enormous distance, although the bottle containing them may be held right under the nose. The olfactory nerve is, in fact, narcotised. In anosmia I prescribe one-twenty-fourth of a grain of strychnia mixed with two grains of powdered sugar, to be used as a snuff twice a day; and increase the dose to one-sixteenth and one-twelfth of a grain should no effect be produced. In the hyperosmia of epileptic patients, when preceding attacks, I inject one-sixth of a grain of the acetate of morphia with one-sixtieth of a grain of the sulphate of atropia subcutaneously. This soothes the explosive tendency of the nervous centres, and acts as a preventive of epileptic attacks. (Dr. Julius Althaus, p. 72).

Nerve Affections.—*Citrate of Caffeine.*—Medicinally, caffeine or theine in the form of a soluble citrate has gained a certain degree of favour in a variety of complaints which may at first sight appear of more or less distinctive pathological causation. In doses of a grain, it has been used in tic douloureux, hemicrania, and varied forms of neuralgia. Coffee, in the form of

strong decoction, has further been recognised as an astringent in certain forms of diarrhœa, as a febrifuge in fevers, and as a tonic and stimulant in cases of adynamy. In all probability, the therapeutic action is similar, if not identical, in all these different classes of cases. The most interesting therapeutic property, however, of the citrate of caffeine, in doses of not less than three grains, is its diuretic action in cases of advanced cardiac dropsy, where muscular embarrassment and neurosal inco-ordinate cardiac action are amongst the striking indicators of progressive cardiac mural decay. Through the agency of the sympathetic system, and specially of the intrinsic cardiac ganglia, we can, with the aid of citrate of caffeine, promote co-ordinate cardiac power, without of necessity, increasing cardiac action; and through the agency of the vaso-motor nerves we can excite contraction of the arteries and increase arterial blood-pressure and power of the pulse. It probably also acts like belladonna in overcoming the controlling effect of the splanchnic nerve, and through this medium that of the abdominal vascular system generally; and although this *may* be induced indirectly as a reflex act commencing in the sensory nerve (depressor nerve of Ludwig and Cyon) of the heart itself, the effect is practically the same, for increased power of cardiac contraction and diuresis are promoted by the increase in vascular pressure. Theine, as is well known, is the active principle not only of tea and coffee, but also of Paraguay tea and *Paulinia sorbilis* (guarana), and probably also of cocoa. The essential oil of tea, from which the dried leaves derive their flavour, is opposed to the action of theine; it excites the nervous system, and is the substance to which must be ascribed disquieting disorders of the nervous system which result undoubtedly from tea-drinking, such, *e.g.*, as palpitation of the heart, excitability, and wakefulness. (Dr. Lewis Shapter, Medical Times and Gazette, July 9, p. 33.)

Organic Nervous Disease.—*Use of a new Silver Salt in.*—Dr. Allan Lane Hamilton states that phosphate of silver possesses advantages over the other silver salts which entitles it to a fair trial. The phosphate of silver is tribasic; and is prepared by precipitating a solution of silver nitrate with a solution of trisodic orthophosphate, washing with distilled water, and drying in the dark; a heavy powder of a dark lemon-yellow colour, which darkens slightly on exposure to the air, is thus obtained. Dr. Hamilton has given this remedy for months, in doses varying from $\frac{1}{3}$ to $\frac{1}{2}$ a grain, without any skin discoloration whatever, its administration being unattended by the gastric irritability that so often follows the use of either the nitrate of silver or phosphide of

zinc. At the same time its therapeutic effects are much more pronounced. It is best given with some such excipients as ergot and glycerin, for vegetable substances tend to decomposition, and for this reason it cannot be made into pills with confection of roses. The drug is of especial value, 1, in cases of more or less acute myelitis with disturbance of the bladder and rectum; 2, in cases of sclerosis of the nervous substance. (Practitioner, May, p. 363.)

TOOTHACHE.—*Chloral Hydrate.*—Dr. Spörer recommends that three to four lumps of hydrate of chloral (0·03—0·06 gram.) should be inserted into the hollow and painful tooth, the chloral being allowed to dissolve. He has treated thirty-eight cases successfully in this way, and has also obtained good results in several cases of hemicrania resulting from carious teeth. (Practitioner, Sept., p. 217.)

*Nitrite of Amyl and Nitro-Glycerine.*—A short time ago, when suffering from a severe attack of toothache in consequence of caries, I was led to apply amongst other things some cotton-wool steeped in Richardson's compound anæsthetic ether, which contains nitrite of amyl. This at once gave instant relief; and I found if, immediately on cessation of the pain, laudanum was applied by means of some fresh cotton-wool, the pain could be kept off regularly for four hours at a time. In fact this treatment was kept up for days with uniformly the same result. I now learn that a one per cent. solution of nitro-glycerine applied to the tooth has the same effect in stopping pain as nitrite of amyl, and there can be little doubt as time goes on we shall have further instances brought forward of the similarity in effect exhibited by these two substances. (Dr. F. P. Atkinson, Practitioner, Oct., p. 265.)

## DISEASES OF THE CIRCULATORY SYSTEM.

ANÆMIA.—In diet, the indication is to allow meat in considerable quantity as soon as the digestive organs are capable of the work imposed on them; but where, as so often happens, the digestive power is at a minimum, then recourse may be had to meat-essences, peptonised foods, and (as an extreme measure) nutrient enemata. There is frequently a great distaste for nitrogenous food among these subjects, many of whom owe their anæmia in large measure to their preference for a diet of non-nitrogenous materials; and it follows, therefore, that chief attention should be paid to this point, especially as the organs of digestion are more or less deranged by the anæmic state. Of all remedies, iron maintains, as it always has maintained, a pre-eminence in the treatment of anæmia. It

seems to act directly upon the blood-forming viscera, and probably also upon the digestive organs—*i.e.*, on the gastro-intestinal tract. No wholly satisfactory explanation has, I believe, been given of the mode of action of the iron in either of these directions, or of the reason why the best results in the most marked cases of chlorosis are obtained by the administration of heroic doses far in excess of what is actually required in blood-formation, and much more also than is actually absorbed. Trousseau called iron as much a specific in chlorosis as mercury was in syphilis; and there was truth in the remark, although we may not know in what its specific action precisely consists. Next to iron, and in some forms of anæmia to be preferred to it, is arsenic. This metal is a powerful hæmatinic. It acts on the tissues as well as on the blood and blood-forming organs; and its effect upon the cutaneous epithelium has been actually demonstrated. It is almost the only drug which has been successful in the treatment of severe idiopathic anæmia, which more often resists all medication. (Dr. Sidney Coupland, p. 48.)

Angina Pectoris.—*Nitro-Glycerine.*—Nitro-glycerine can be prepared for use in a solution either of alcohol or ether, a one per cent. solution in alcohol being that generally preferred. Nitro-glycerine bids fair to prove an anti-neuralgic of the greatest value, especially in cases of angina pectoris and such other affections as nitrite of amyl has hitherto been much used in, taken at intervals of two to four hours, in doses of about two drops of the one per cent. solution, and increased until full physiological action is obtained. The relaxed condition of the blood-vessels induced lasts usually about half an hour. Doses of the above strength and frequency have been continued through several consecutive days with safety and success in warding off threatening attacks of angina pectoris. (Dublin Journal of Medical Science, July, p. 96.)

My experience, so far, of the comparative merits of nitrite of amyl and nitro-glycerine is, that while the latter acts more slowly—several minutes elapsing before its influence is fully felt—it seems to be more permanently beneficial. The initial dose was one drop of the one per cent. solution in spirit three times a day. It was found that the symptoms were controlled by ten drops three times a day. Under this treatment the patient improved so much that he could walk half a mile at an easy pace without discomfort, and when the pain began to make its appearance he could put a stop to it at once, and continue walking by swallowing a dose of ten drops. (Dr. McCall Anderson, p. 89.)

Apoplexy.—*Management of Stertorous Breathing.*—Suffocation, added to grave mischief in the brain, must of necessity

affect not merely the symptoms and progress of cases, but also their mortality. Those only who have observed the extraordinary change on the removal of suffocative stertorous breathing, can judge how the diagnosis and prognosis are affected by it, and not less so, the treatment and morbid anatomy. The following case impressed Dr. Bowles with the importance of the management of stertorous breathing:—In October 1863, Miss B. was seized with apoplexy. On my arrival there was a partial return to consciousness, and the left side was found to be paralysed; there was pharyngeal stertor when in the recumbent posture, and she appeared uneasy when placed on her right side; she was therefore placed on her left, when the stertor ceased. A blister was applied to the nape of the neck, and she remained in this position for nine days. She was now better, and spoke to me. Fearing a bed-sore, I desired the nurse to change her position, by turning her from her left to her right side. Soon after this was done, she was distressed for breath, and the countenance became livid. On my arrival, I found the difficulty of breathing gradually increasing; the blistered surface, as well as the ear upon which she had lain, of a dark purple hue; and the pulse, which had before been weak and irregular, full and bounding. There were large mucous *râles* over the whole chest; she was quite unconscious, and death from suffocation was imminent. Finding that these symptoms supervened upon the change of position, I had her replaced upon her left side, and immediately the pulse sank, the mucous stertor ceased, the breathing was relieved, the lividity of countenance passed away, and the blistered surface, which had been almost black, resumed a bright cherry-red colour. This additional shock, however, proved too much for her, and she died the same day, peaceful and conscious. The salient points of this interesting case are these:—1. Pharyngeal stertor ceased when the patient was placed on her side; 2. There was a slow but gradual improvement subsequently to this; 3. Mucous stertor and imminent death supervened when she was changed to the opposite side; 4. Instant relief followed on resuming her original position; 5. A return to consciousness was coincident with the cessation of stertor; in other words, with the removal of the respiratory difficulty. On a careful examination of the chest after she became quiet, I found all *râles* slowly fade away from the right side, or that which was uppermost, and the natural breathing return; but the left lung, which had been dependent throughout, was dull on percussion, and deficient in respiratory murmur. The explanation now became clear, viz., that the dependent lung had become

filled with some mucous fluid, and that, on changing the side, the fluid by gravitation was finding its way across the trachea to the opposite lung; but, in doing so, it had been churned into foam by the ingoing air, giving rise to mucous stertor; and this foam, by filling up the larger bronchial tubes, was quickly causing suffocation, with all its usual results. As a point of management, then, in cases of apoplexy, it would appear necessary to keep the patient on one side, and not to change it; but which should this be? Healthy people, when lying on the side, breathe chiefly with that side which is uppermost, for the intercostal and other thoracic muscles of the lower side are fixed between the weight of the body and the bed, and the breathing of this side is almost entirely diaphragmatic. It must be remembered, too, that, in placing the paralysed side downwards, the injured side of the brain is upwards, and, therefore, relieved from hypostatic congestion, a condition always liable to occur when an injured part remains dependent. (Dr. R. Bowles, p. 83.)

Erectile Tumours.—M. de Saint-Germain treats nævi in children by interstitial injections with a Pravay syringe. The injections are made one at a time, and at intervals of eight days. Each injection produces a small scar, and the operation is only complete when the whole surface of the nævus has been transformed into a scar. A single drop of the caustic or fluid of Piazza is injected on each occasion. The composition of the liquid is as follows:—℞. Ferr. perchlor. 25 grams.; sodæ chlorid. 15 grams.; aq. distill. 60 grams. P.M. (Practitioner, May, p. 357).

Subcutaneous Nævi.—*Galvanism.*—About a year ago a child, aged nine months, was brought to me with a nævus about three-quarters of an inch in diameter, filling up the fossa on the left side of the nose. The swelling was entirely subcutaneous, and it was evident that none of the applications which cure the superficial form of the disease would be of any use. The gold needle usually employed in such cases was connected with a battery and introduced into the tumour, but the restlessness of the child (his eye being endangered) made me abandon it. Two lengths of No. 24 silver wire were then passed through the middle of the swelling, parallel to each other, and about a quarter of an inch apart. The zinc and carbon of a Bunsen cell (quart size) were then connected with the ends of each wire separately. The result was great heat in the wire during the short period, one or two seconds, of connexion. The ends of the wires were then tightly twisted together, protected by being covered with lint and plaster, and

left for the next application, which took place a week later. The current was applied three times altogether. The wires were removed after the third galvanisation, and no further treatment was needed. The nævus is now scarcely perceptible. This mode of using the galvanic current in the deeper nævi appears to me to be recommended by its simplicity and freedom from danger. There is less pain than is caused by the usual introduction of needles at each operation, and a single cell (bichromate, Grove's, or Bunsen's) is sufficient, the only resistance being the fine silver wire. (Dr. Carey Coombs, Lancet, Aug. 27, p. 374.)

Varicocele and Varix.—*Subcutaneous Ligature.*—The treatment of *varicocele* always presents a certain difficulty to the surgeon. This disease is not dangerous to life, nor does it seriously interfere with ordinary functions and avocations; but it is a source of harrassing if not severe pain, is a matter of solicitude to the patient, and in some cases leads to wasting of the testicle. The former considerations have led some to recommend palliation by suspension, the vein-truss, and the cold douche; while the immense number of operative measures which have been devised, and which are not devoid of danger, bear witness to the importance of the latter. In the subcutaneous ligature by catgut we have a means of meeting the difficulty. It is singularly easy of application, free from risk, and very certain in its results. The mode of applying it is as follows. The veins are carefully separated by the fingers from the artery and vas deferens, and a needle armed with catgut is thrust through at the point of separation; it is again introduced at the orifice of emergence, made to pass between the veins and the skin, and finally brought out at the original entrance. The two ends are then firmly knotted with as much force as strong catgut will bear, and cut short. By traction on the loose skin of the scrotum, the knot is made entirely to disappear, and the punctures are covered with salicylic wool saturated with collodion. The same manœuvre is repeated at a distance of an inch or a little more. The success of the treatment of varicocele by this means induced me to apply it also in *varix of the leg.* So long as a varicose vein is not a source of inconvenience or danger to the patient, the general opinion seems to be that the use of the elastic stocking is all that is necessary. If that be not effectual as a cure, at least it prevents further deterioration. I should be inclined to say that, even in advanced cases, the stocking ought first to be tried; but when solid œdema and eczema and ulceration cannot thus be kept in check, or perpetually recur, some more radical measure becomes plainly desirable. The

operation is performed precisely as for varicocele. The needle is passed first under the vein, and then between the vein and the skin, entering and emerging by the same punctures. It is not so easy to draw the skin over the knot after ligaturing as in varicocele; and this will be facilitated by slightly enlarging the puncture by means of a tenotomy-knife. When, as is sometimes the case, the limb is swollen and brawny, and the veins run, as it were, in gutters cut out of the solid œdema, the difficulty of operating is considerably increased. In such cases I have, as a preliminary, kept the patient at rest, and applied the india-rubber bandage for a few days. It is always of advantage, during the operation, to have the the limb gently constricted by a bandage above the point of ligature, in order that the veins may be distended with blood, which afterwards coagulates. In dealing with veins, it is impossible to be too cautious, and it adds little to the difficulty or or trouble. For the same reason, I apply to each little puncture some layers of salicylic cotton and flexile collodion. I find this a most admirable antiseptic dressing for small wounds of all kinds. After carefully cleansing the wound with carbolised oil, the least irritating solution, I cover it with wool and collodion, with the most perfect faith that, when the covering drops off, the wound will be healed. I have several times referred to points in the treatment of *nævus*. Let me do so once more. If a nævus be ligatured in the usual manner, it drops off after a little inflammatory action, and leaving a sore to heal. But if, after ligature with carbolized silk, it be covered with a broad shield of cotton-wool and collodion, when it is ready to come away (the period varying with the size), it will be found that there has been no suppuration, and that the wound has healed. It is a very perfect imitation of the method of healing under a scab. In subcutaneous surgery of all sorts, I therefore regard the application as one which adds distinctly to the certainty of success. (Mr. John Duncan, p. 174.)

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## AFFECTIONS OF THE RESPIRATORY SYSTEM.

APHONIA.—*Faradisation of the Vocal Cords.*—Complete aphonia is certainly usually attributable to hysteria, but in this case the fact was proved that the loss of function was not due to hysteria, as she was placed completely under the influence of chloroform, when she did not speak, but continued to whisper. The instrument then showed that the vocal cords were in a very relaxed state, and crumpled up as it were near their middle, but otherwise apparently quite healthy. The cords were faradised by means of Mackenzie's electrode, whenafter

very few applications of the electro-magnetic current the voice was partly restored, but as a very harsh "croak" at first, and very monotonous. She was asked to sing over a scale of music, but every note was pronounced in the same tone, and she could not modulate her voice either piano or fortissimo. After the current had been repeated at gradually lengthening intervals, however, the voice was permanently restored, and now she speaks in a clear and natural tone, which had been lost for nearly five years. (Mr. R. Torrance, p. 75.)

Asthma.—*Electricity.*—The best remedy for cutting short an asthmatic attack is the local application of the induced current, which often causes the attack to disappear as if by magic, and is much more efficient than the pneumatic apparatus. According as the seat of the disease appears to be in the higher or lower parts of the nerve, the author applies the electrodes to both sides of the neck, under the lower jaw, about three-quarters of an inch in front of its angle, or opposite the thyroid cartilage in front of the sterno-mastoid. The currents must not be too feeble. The patient must clearly perceive that the current goes straight through the soft palate or through the larynx. When the attacks are violent the current should be applied for a quarter or half an hour at least twice daily. As recovery takes place the applications may be shortened until they are at length made only once or twice a week. The author rarely applied direct faradisation, and found no good from the constant current. (Dr. Max Schaeffer, p. 121.)

*Fuming Inhalations in Asthma.*—In an annotation in the journal for April 23, reference is made, in general terms, to the composition of "the many preparations which evolve fumes when burnt," which have been recommended as palliatives in asthma; one of these, evidently a proprietary medicine, has been referred to recently in the daily press as having given relief to the late Earl of Beaconsfield. Some years ago, a very intelligent gentleman, who had long suffered from paroxysms, almost nightly, of bronchial asthma, consulted me, and informed me that he had seen many doctors and tried many remedies, but that nothing relieved him like the inhalation of the fumes of an "anti-asthmatic powder," which could only be obtained at a particular place in London. Shortly afterwards, another patient, suffering similarly, told me he had tried many things, but that nothing eased him like the smoke from a powder he was accustomed to burn; he had come a long distance, and had some of the powder in his pocket, as he did not feel safe without it. On comparing the two powders, which bore different names, I thought they appeared identical. One of them was analysed for me by

Messrs. Southall, with the result of furnishing the following formula, which I have prescribed with frequent success. ℞. Potassæ nitrat. ʒss; pulv. anisi fructûs ʒss; pulv. stramonii folior. ʒj. Misce. A thimbleful of the powder, placed on a plate, is pinched into a conical shape, and lighted at the top. It burns like a pastile, and is held near the patient, who inhales the fumes. (Dr. James Sawyer, British Medical Jour., May 21, p. 804).

There can be no question as to the value of fuming inhalations in the treatment of asthma. The ordinary nitre-paper often fails, because it is not strong enough. For some time past, I have been in the habit of using very thick and strong nitre-papers, which may be called "nitre-tablets." They contain both chlorate and nitrate of potash. Each consists of six pieces of white blotting-paper, about six inches square, and they are made by dipping them into a hot saturated solution of nitre and chlorate of potash. Before the pieces are quite dry, they may be sprinkled with Friar's balsam, spirit of camphor, tincture of sumbul, or some aromatic. The nitre-paper so prepared is as thick as cardboard, each piece consisting of six pieces of blotting-paper, closely adherent, and covered all over with crystals of saltpetre and chlorate of potash. The door and windows having been closed, the tablet is placed on a fire-shovel or piece of metal of some kind, and folded down the middle, so as to make it like a tent or the cover of a book. When lighted at each end, it burns very quickly, throwing out a flame often four or five inches long, and giving rise to dense volumes of smoke. The asthmatic patient almost immediately obtains relief, and drops off into a quiet slumber, from which he awakes refreshed. These tablets often succeed when the ordinary nitre-papers do no good. They nearly always induce sleep, and I have used them with success in cases of insomnia when most of the ordinary remedies have failed. Large pastilles composed of equal parts of nitre and lycopodium are also useful in asthma. (Dr. William Murrell, British Medical Journal, June 11, p. 918).

Bronchitis in Phthisis.—Externally the chest may be rubbed with linimentum camphoræ, linimentum terebinthinæ aceticum, or, in more severe cases, a waistcoat should be made of spongio-piline, fastening by means of tape shoulder-straps and tapes to tie in front, and this should be worn constantly and kept wrung out of hot water and sprinkled with a few drops of turpentine. This waistcoat has the advantage, in addition to its counter-irritant effect to the chest, of keeping the patient in an atmosphere of steam and turpentine most

likely to soothe the irritable condition of his bronchial tubes. The advantages of turpentine in the treatment of bronchitic affections are not sufficiently appreciated. Rich sufferers go to live in the pine-woods of Arcachon with benefit, but the homely application of common spirits of turpentine is not supposed to be equally effective. Next in importance to turpentine in sulphur; the older physicians called it balsamum pectoris, and Graves tells us that Hoffman was in the habit of adding it to all his cough prescriptions in all cases of chronic cough in the aged and debilitated, and he himself expressed the opinion that five or ten grains of sulphur taken three or four times a day is one of the best remedies that can be prescribed in cases of chronic cough with constitutional debility and copious bronchial secretion. (Dr. Robert Saundby, p. 95).

Chronic Nasal Catarrh.—*Iodoform.*—Dr. H. A. Eberle treats chronic nasal catarrh in the following manner. He directs that first an ointment should be made, thus: Iodoform, ʒ i; extr. geranium (solid), grs. x; carbolic acid, gtt. xv; cosmoline, ℥i. M. Bougies made of absorbent cotton, saturated with the above ointment, are introduced into the nasal passage as far as necessary at bedtime, and left there till morning, when they may be expelled by blowing the nose. This is repeated every evening for a week or ten days, when the most obstinate catarrh will yield. Before introducing the cotton tent the nares should be washed out with a weak tepid solution of common salt, introduced by means of the posterior nasal douche. (Glasgow Medical Journal, May, p. 406.)

Croup.—The exudation of fibrin very frequently commences on the surface of the tonsils, thence spreads along the arches of the palate, coats the posterior surface of the *velum palati*, sometimes surrounds and encloses the uvula; and at last descending, covers the internal surface of the pharynx and œsophagus, the larynx and trachea. Not merely have I repeatedly found the application of a solution of nitrate of silver completely successful in removing the fibrinous crust covering the tonsils, velum, and uvula, but I have been led to attribute the rapid alleviation and ultimate removal of all the other symptoms to this remedy, even in cases in which, from the severity and peculiar signs of the complaint, I had no doubt that fibrin had already exuded from the lining membrane of the larynx and trachea. The solution which I employ is a scruple of nitrate of silver in an ounce of distilled water. By means of a large camel-hair pencil, this solution is to be freely applied, once or twice a day, according to the severity of the symptoms, to the whole lining membrane of the fauces. (The late Prof. W. Mackenzie, p. 124.)

Diseases of Respiratory Organs, and Prevention of Contagion from Infected Atmosphere.—*Dr. Feldbausch's Permanent Nasal Inhaler.*—This inhaler, invented by Dr. Feldbausch of Strasburg, is useful as a new method of continuous or temporary inhalation of volatile substances by the nasal passages. By the fact of its application to the nose, it is specially distinguished from the apparatus hitherto employed, in which the air conveying the medicament must be aspired by the mouth. This buccal aspiration demands sustained attention, and soon becomes fatiguing, thus it is only applicable during a short time, and these apparatus cannot be employed for permanent inhalation, and are far from being capable of such general use as the permanent nasal inhaler. The new apparatus is introduced only into the nostrils, which are the natural inlets of the air in the act of ordinary respiration. This fact allows of their being easily employed for hours together—even all day and night—without giving them any attention, and consequently, without bringing on fatigue, and without in any way interfering with the daily occupation of the wearer. The permanent inhaler consists of a pair of tubes or capsules, which remain fixed by their own action in the nose, and contain a morsel of blotting-paper or flannel, intended to receive the medicament used. Three different kinds are made. The first form (Nos. 1 and 2) is composed of two tubes connected together, which, when applied to the nose, are scarcely visible, and not disfiguring. The action is more active than with Nos. 3 and 4, the evaporation surface of the blotting-paper being larger. This model is preferable in nasal catarrh, as it is easily removed in cases of sneezing or abundant secretion. No. 1, for men, is oval, and larger than No. 2, which is for ladies and young persons. The second form (No. 3) consists of a pair of small capsules united together; when *in situ*, nothing is visible but a fraction of the thin uniting link. The third form (No. 4) consists of two capsules, isolated one from the other, which can be introduced entirely into the nostrils so as to be absolutely invisible. The two latter models have smaller evaporating surfaces, and their activity is consequently diminished. The action, however, can be increased by moistening them more frequently with the medicating liquid. Many volatile substances may be used with this permanent inhaler, both pure and diluted. Among them may be enumerated carbolic acid, balsam of Peru and of tolu, bromine, camphor, creasote, chloroform, oil of eucalyptus, of juniper, of pine, of turpentine, iodine, iodoform, nitrite of amyl, &c. The dose required may be administered with exactness—an important matter in narcotic sub-

stances—for it allows the inhalation of ether and chloroform in small doses, in the place of subcutaneous and internal applications. The use of the permanent inhaler may be extended to the majority of diseases of the respiratory organs. In chronic catarrh, when it is not complicated or induced by profound changes of the tissues, or by constitutional maladies, and in phthisical patients, the inhaler may be usefully employed. It is also useful in diseases due to the inspiration of infected air, as it permits the inhalation of antiseptic substances. Nurses, medical men, and people obliged to remain in the same atmosphere as phthisical, scarlatinal, and diphtheritic patients, will find it more useful to apply No. 4 inhaler, because it is invisible; and patients also may use it for permanent inhalation. The permanent inhaler is used in the following way. By means of a drop-measure, the prescribed number of drops of the medicament required are dropped on the paper in the capsules. The apparatus is then placed in the nostrils, and respiration is carried on during the prescribed time. From time to time, deep and prolonged inspirations should be made. The frequency with which the medicine used should be renewed is regulated by the constitution and nature of the disease. Of carbolic acid, which volatilises slowly, as a rule, from two to four drops are sufficient for a moderately strong inhalation lasting one or two hours; but if the paper be additionally moistened, the inhalation may be continued during the entire night without needing renewal. The apparatus should not be moistened outside by the liquor. If this should occur, it must be carefully wiped, so as to avoid any discomfort to the nose. It is also important that the paper should not be saturated so that the liquid drops from it. A deep inspiration might naturally cause it to penetrate into the nose. The invisible inhaler is completely hidden in the nose. To produce this effect, one end of it must be taken with the convex opening directed upwards; the opposite end is pushed into the nose, directing it upwards and backwards; then the anterior end of it is pushed towards the top of the nostril, until there is nothing left visible. To remove the inhaler, pressure is made from below upwards towards the tip of the nose until it falls out. The wholesale agent for the instrument is M. C. Jehl of Strasburg. (London Medical Record, April, p. 175.)

Drowning.—Dr. Howard's Direct Method of Artificial Respiration.—1st. *Instantly* turn patient downwards, with a large firm roll of clothing under stomach and chest. Place one of his arms under his forehead, so as to keep his mouth off the ground. Press with all your weight two or three

times, for four or five seconds each time, upon patient's back, so that the water is pressed out of lungs and stomach, and drains freely out of mouth. Then: 2nd. *Quickly* turn patient face upwards, with roll of clothing under back, just below shoulder blades, and make the head hang back as low as possible. Place patient's hands above his head. Kneel with patient's hips between your knees, and fix your elbows firmly against your hips. Now—grasping lower part of patient's naked chest—squeeze his two sides together, pressing *gradually* forward with all your weight, for about three seconds, until your mouth is nearly over mouth of patient; then, with a push, *suddenly* jerk yourself back. Rest about three seconds;—then, begin again, repeating these bellows-blowing movements with perfect regularity so that foul air may be pressed out, and pure air be drawn into lungs, about eight or ten times a minute, for at least one hour, or until patient breathes naturally. *Note.*—The above directions must be used on the spot, the first instant the patient is taken from the water. A moment's delay—and success may be hopeless. Prevent crowding around patient; plenty of fresh air is important. Be careful not to interrupt the first short natural breaths. If they be long apart, carefully continue between them the bellows-blowing movements as before. After breathing is regular, let patient be rubbed dry:—wrapt in warm blankets—take hot spirits and water in small occasional doses, and then be left to rest and sleep. (Dr. Benjamin Howard, p. 138.)

Hooping-Cough.—Some go so far as to say that carbolic acid will cure hooping-cough. This statement has come usually from those of limited experience, though sufficiently good results have been obtained to justify us in pursuing the line of reasoning which first suggested a trial of the remedy. Not long since a distinguished member of our profession, who suffered severely from hooping-cough, said that the only remedy which afforded him relief was carbolic acid inhalation, that the favourite treatment with bromide of potassium and belladonna was tried with the result that for a few hours the cough was relieved after taking the first few doses, but in a short time the effect passed off, and was followed by increased violence of the cough and painful dryness of the throat. In adults the spasmodic cough is the most serious symptom of the disease, but in infants we have to fear the rapid wasting and frequent diarrhœa perhaps more than the cough. So that the use of carbolic acid inhalation must be limited, but within those limits it may be said to have a special effect. The treatment recommended by Sydenham of purging actively is a

wise one, for the distress in respiration and cough is certainly diminished when the mucous discharges from the bowels are encouraged. It may also be observed that a spontaneous diarrhœa in hooping-cough is not to be controlled by opiates or astringents. I would suggest a trial of other volatile agents for the purpose of inhalation, such as turpentine, creasote, oil of amber, benzoin, &c. The common plan of stirring some tar with a hot poker is certainly attended with benefit, and is largely used in my hospital practice. It is only necessary to observe that if we are to expect relief from this kind of treatment, it should be carried out on proper principles. It is of no practical use to order twenty or thirty drops of carbolic acid to be added to a pint of hot water, and the steam to be inhaled, for the quantity of acid which evaporates is only propertinate to the amount of water given off as steam, and under such conditions it is evident the amount would be infinitesimally small. (Dr. Robert Lee, p. 125.)

Laryngeal Phthisis.—The medicinal treatment of laryngeal phthisis consists at first in the employment of the antiseptic method. This is adopted by a great number of specialists in all countries. I have found a very cheap and easily administered remedy in the balsam of Peru—that is to say, in the benzoic acid which it contains. I order it to be inhaled three to four times a day for five minutes in the following manner. We take half a litre (about 18 oz.) of boiling water the heat of which is kept up by being placed over a spirit lamp, and into which is put ten drops of the following mixture,—balsam of Peru, 10·0; spirits of wine, 5.0. The patient inhales through a sort of conical funnel made of a sheet of cardboard paper, one metre in length (nearly 40 inches). The width of the funnel at its upper end ought to fit the mouth; at the lower it ought to be the size of the vessel containing the water. Naturally the inhalations must be continued for some time, from one month to a year. It is good to change the remedies for some days every two months. (Dr. Morris Schmidt, p. 116).

Pulmonary Affections.—*Antiseptic Inhalation.*—Antiseptic inhalation is evidently and deservedly coming into notice, as a valuable aid in the treatment of a large and important class of diseases. I believe that it is capable of much greater development and extension, and that it will ultimately play a distinguished *rôle* in the pulmonary therapeutics of the future. Antiseptic inhalers or respirators were first made to my order by a local tradesman, in common tin, of the exact shape and size of the ordinary metal respirator. These were, however, somewhat primitive in style; and they have since

been extensively made by Messrs. Maw, Son, and Thompson, in a more elaborate and convenient fashion. The apparatus is extremely simple. It consists of a space for a pledget of tow or cotton-wool, enclosed between the perforated surface of the respirator and an inner perforated plate, which can be raised so as to permit the tow to be saturated with the antiseptic solution. Elastic loops are attached to pass over the ears, and retain it in position. The inhaler may be procured either plain, or of a slightly smaller size, and covered with black cloth, for wearing out of doors. The pledget of tow, which may be changed once a week or so, should be sprinkled with from ten to twenty drops of the antiseptic solution, from a drop-stoppered phial, twice-a-day at least, according to the extent to which the inhaling may be carried on. Of this the patient is the best judge, and the length of time and quantity of solution should be regulated by tolerance and effect. The most important times for inhaling are for an hour or so before going to sleep at night, and after the morning expectoration, which leaves the suppurating surface or cavity dry to be acted upon—disinfected, so to speak—by the antiseptic vapour. (Dr. J. G. Sinclair Coghill, p. 101.)

The cavity of the inhaler is filled with loosely-packed tow, which is used to absorb the medicament desired to be inhaled. My own experience has been with carbolic acid and oil of eucalyptus only, but others use compound formulæ; of these two I prefer the oil of eucalyptus. In using carbolic acid I have ordered a solution of one to twenty strength, and have ordered the tow to be wetted with it; with eucalyptus oil I have ordered ten drops to be put on the tow twice a day. There is no rational ground for believing that antiseptic inhalations can be regarded as likely to effect cures. I have used them in a large number of cases, and have not yet seen any cures result; but the patients found great relief from their use. They readily take to the use of the inhalers, make no complaints as a rule, and the objective results are mainly in checking the purulent secretion and allaying the cough. (Dr. R. Saundby, p. 95.)

At the Northern Counties Hospital for Diseases of the Chest a number of Dr. Coghill's inhalers and the inhaling mixture recommended by him have been in diligent use since May 31st, with satisfactory results; the amount of sputa having in each case lessened. Patients who commenced to cough and spit at four o'clock in the morning can already lie until rising time without coughing. Some of them complain that they do not get the phlegm up so easily as before; but I am of opinion that the sufferers continue to cough

more from long habit than from real necessity. I find that our inhaling patients observe the strong smell of the antiseptic in their sputa, and that half an hour twice a day appears sufficient to use the inhaler; also that twenty minims dropped on at once are enough for two days' use. More has been found too irritating to the glottis in the cases in which we have used it. I prefer surgeons' lint, doubled, to cotton-wool or tow; and have had made for me an inhaler more elegant, a little, than Dr. Coghill's. It fastens by a broad India-rubber band at the back of the neck; this does not hurt the ears. The outer perforated plate is hinged, and therefore more easily manipulated. The makers are Messrs. Henry Aitken and Co., Bishophill, York; the price, five shillings each. My conviction is, that medicated inhalation might be used with benefit in more diseases than Dr. Coghill enumerates; *e.g.*, in hay fever; influenza; incipient phthisis; or where a husband sleeps with a consumptive wife, or *vice versâ;* hæmoptysis between attacks; chronic bronchitis, with profuse, inspissated, or difficult expectoration; asthma from loss of lung-tissue; so-called larnygeal phthisis; circumscribed gangrene of the lung; diphtheria after seeing infectious cases, *e.g.*, small-pox, fevers, &c. Dr. Coghill's plan supplies a desideratum essential for delicate girls, ladies, and youths, who may now receive a benefit hitherto denied them; and, by means of the inhaler, old people may upon occasion sweeten their breath for an evening or whole day by inhaling an ozonising and antiseptic aroma of agreeable flavour—*e.g.*, essence of lemon, essence of orange, essence of bergamot, eau de Cologne, sassafrass, or other ozonising perfume. (Dr. Carrick Murray, British Med. Journal, July 23, p. 121.)

Fœtid pus from the lungs is not so rich in bacteria as putrid matter from some other regions; and this may be the explanation of the facility with which odour disappears under this mode of treatment: there being but few organisms to kill, the work is soon completed. With regard to the mechanism adopted, the following is a description of the kind of respirator I find to answer best. Over a wire framework, shaped like a respirator, made to cover both the mouth and nose, two or more layers of ordinary antiseptic gauze are stretched; along the concavity inside, a narrow strip of sponge is placed, and, finally, the whole is fitted accurately to the face by a circumferential pad made of gutta-percha tissue, stuffed with cotton-wool, or folded lint, which is more manageable. Antiseptic gauze in the dry state gives off a vapour of carbolic acid. Bearing in mind, however, the

large amount of air that would in ordinary breathing pass to and fro, it will be very evident that this comparatively small piece of gauze must soon become exhausted, and require recharging; this is secured by the whole being dipped every half hour or so at first, afterwards less frequently, into a watery solution of carbolic acid of the strength of 1 in 40; the gauze is, besides, renewed every two or three days. These respirators or dressings are worn as constantly as possible; in fact, the only occasion on which their temporary removal is permitted are during a meal, for the purpose of expectorating, and for that of dipping. Taking into account the apparent inconvenience, it is a little surprising with what readiness even hospital patients fall into the way of wearing these appliances with the greatest constancy both day and night. (Dr. W. Williams, p. 109.)

Dr. W. Williams utilises the carbolic gauze of Lister, and merely saturates it occasionally with an aqueous solution of the acid. The old forms of inhalers, as well as the modern spray producers, necessitate a quantity of aqueous vapour being introduced into the bronchial tubes and into the air-cells, much in excess of what is ever naturally taken in. There is a positive evil in this, such vapour condensing, and being then deposited on the delicate epithelial lining of air-tubes and cells, interferes with the osmic movements which respiration induces. That respiration is practically impeded is shown by the coughing and the suffocating sensation produced, so that a very few minutes' use, at one time, of inhalers and vaporisers is all that is possible. The suspension put to natural processes is apt to be overlooked in our eagerness to get the drug brought into actual contact with diseased lung-tissue; and the evil produced by the water is far more than commensurate with the good that the drug can do. The mode of conveyance of the minute particles of carbolic acid by Dr. Williams's respirator is not open to the above objection; and as the drug itself has been tested in surgical practice, and found to be of invaluable service in the treatment of all suppurating surfaces which are accessible, it is fair to infer that, if it can be applied *per se* to the lungs, it may be equally efficacious in checking the growth and development of morbific germs in them, and thus allow tissue to be reconstructed. (Mr. Robt. Hamilton, p. 114.)

In a case treated by continuous antiseptic inhalation, the success was owing to the particular method of treatment employed—viz., causing the patient to respire as continuously as possible an antiseptic atmosphere. The result obtained would appear to bear out the experiments of Schüller of

Greifswald, who found that animals rendered artificially tuberculous were cured by being made to inhale creasote water *for lengthened periods*. Intermittent spraying or inhaling does not produce the same result. In order to ensure success the application to the lungs must be made *continuously*. For this purpose I have used various volatile antiseptics, such as creasote, carbolic acid, and thymol. The latter I have now discarded as being too irritating and inefficient. Carbolic acid seems to be absorbed, for it has been detected freely in the urine, in this and other cases where it was inhaled, by my friend and colleague Mr. Falconer King, lecturer on chemistry. Mr. King has been unable to find any trace of creasote in the urinary excretion after the use of creasote for several consecutive days. As absorption of the particular drug employed is not necessary, and therefore not to be desired, I now use creasote only, either pure or dissolved in one to three parts of rectified spirit. Whether the success so far attained is due to the antidotal action of creasote and carbolic acid on a specific tubercular neoplasm, or to their action as preventives of septic poisoning from the local centres in the lungs, it is certain that their continuous, steady use in the manner just described has a decidedly curative action in acute phthisis, and is therefore worthy of an extended trial. (Dr. G. Hunter Mackenzie, p. 107.)

*Inhalation in Phthisis without Special Apparatus.* — Several papers having appeared upon inhalation in phthisis, perhaps some of my fellow-practitioners may be glad to know how they may try it as extensively as they please, without special apparatus, and at no cost. Cut from an ordinary roll of wadding two pieces large enough to cover the nose and mouth. A diamond-shape answers very well. Now, remove the skin-like substance which coats the pieces; put them together, and fold them in a piece of thin muslin, to the ends of which ribbons may be sewn; and your inhaler is made. I have used it for a couple of years, directing the patient to drop five or ten drops of creasote between the layers of wadding, fold it in the muslin, and to wear it for half-an-hour two or three times a day, or sometimes through the night. It is well to tell the patient to have two or three of them, as the moisture from the breath spoils the inhaler after a time. There are cases where, merely as a filter, it may be useful; and using it with creasote, I am convinced, is useful in many cases of phthisis, in some cases of chronic bronchitis, and in some cases of diffuse capillary bronchitis in young people. (Mr. S. Wilson Hope, British Medical Journal, July 16, p. 81.)

Use of Steam in the Sick Room.—*The Bronchitis Tubular Kettle.*—The atmospheric conditions most beneficial in pulmonary congestion, bronchial irritation, and many other affections, are warmth and humidity. Unfortunately, the temperature required indoors cannot be attained without a considerable accession of atmospheric dryness; and this we endeavour to counteract by steaming the air. The use of the ordinary bronchitis kettle for steaming the room of an invalid has not been very encouraging. With the object of evaporating a larger weight of water within a given time, I have had a tin kettle made, supplied with tubes on the principle of the tubular boiler for steam engines. This boiler may of course be any size, but for private use I have had it made seven inches in length, six inches in breadth, and four inches in depth; four tubes, having each of them one inch in diameter, are passed through the boiler, and soldered to it top and bottom. Two necks are also soldered in the boiler; the steam delivery-pipe is connected with one of them, while a straight tin tube run through a perforated cork is fitted into the other. This tube, which is funnel-shaped at its upper end, is lowered into the water to about half an inch from the bottom, and answers three purposes: first of all, when steam is emitted through it, the water in the boiler is shown to be too low; then it allows water to be added at any time without the risk of burning one's fingers by removing a cork or a screw-tap; and thirdly, should the steam delivery pipe become accidently stopped by some unforeseen cause, this tube will act as a safety-valve, letting out water and steam, and preventing any possibility of an explosion. Four short iron legs assist in holding up the kettle on the fire, and support it when not in use. The advantage of the tubes in increasing the surface exposed to the heat is very obvious; four tubes with three inches in circumference and four inches in length, would give an additional surface of forty-eight square inches, or about double that of the bottom of the kettle. I propose to call this vessel the Bronchitis Tubular Kettle; a tap can be fitted into the side of the kettle, away from the fire, and it may be observed that in every case where a large volume of steam is wanted, and boiling water required with as little delay as possible, there can be no simpler or cheaper means of attaining these objects. The cost of this kettle will be, I understand, under ten shillings, without the tap. Mr. Probyn, chemist, 55, Grosvenor Street, is prepared to supply them. It will be important to keep the tubes clear of soot, and brushes will be sold for the purpose. I shall have no pecuniary interest in the sale of the bronchitis-tubular kettle. (Dr. W. Marcet, p. 129.)

## AFFECTIONS OF THE DIGESTIVE SYSTEM.

CANCER OF THE TONGUE.—Chloroform is necessarily the anæsthetic to be employed in operations upon the tongue, for ether is inadmissible; first, because of the difficulty of keeping the patient under its influence when atmospheric air necessarily gains free admission; and secondly, because if, as often happens, a cautery is required in the course of the operation, a dangerous explosion and conflagration in the patient's mouth may be caused by the inflammable vapour of the ether. In cases of secondary hemorrhage after removal of large portions of the tongue, it is practicable to arrest all hemorrhage in the following way. The forefinger, passed well down to the epiglottis, is made to hook forward the hyoid bone, and drag it up as far as practicable towards the symphysis menti. The effect of this is to stretch the lingual arteries so as to completely control for the time the flow of blood through them; and in this way portions of the anterior part of the tongue may be cut off almost bloodlessly. The écraseur has been extensively employed for removal of portions or the whole of the tongue with very satisfactory results. The wire écraseur answers the purpose better than the chain instrument at first employed, in which portions of the tongue were apt to be twisted up. In order to effectually remove a diseased portion of tongue with the écraseur, it is necessary to isolate the growth by pushing well beyond it curved needles set in handles, around which the wire of the écraseur may be passed, and thus be kept in its proper position. Without this precaution, the wire as it is tightened is certain to encroach upon the disease, and lead to an incomplete operation, and no forceps is sufficient alone to obviate the occurrence. The galvanic écraseur, used in the same way, has the advantage of cutting more readily through the tissues, which it sears at the same time, thus preventing all hemorrhage at the moment. It has, however, the drawback, that the separation of the slough necessarily formed by the cautery is very apt to lead to secondary hemorrhage some days after the operation, and hence its use has been abandoned by many surgeons who formerly employed the galvanic écraseur. Paquelin's thermo-cautery is a very convenient instrument for removing small portions of the tongue, since it is not necessary in using it to pass pins beyond the growth. It is liable, however, to the same drawback as the galvanic cautery, of secondary hemorrhage. (Mr. Christopher Heath, p. 193.)

CONSTIPATION.—*Inunction of Castor-oil as a Purgative.*—I have frequently applied castor-oil to the abdomen, under spongio-

of the tincture, is the most trustworthy, if applied upon the bleeding pile, as freed from moisture or dry as it can be rendered, and without stint or fear. Actual cauterisation by means of a needle heated by the benzine method, or the common cautery, is also an esteemed method in anal piles, and with the aid of Mr. Smith's clamp can, I think, be made effective and secure. On the whole, I must say I have preferred the ligature, which can be easily applied, and with efficient limitation, to the points actually requiring it, whether these include the summit of the bleeding orifice only or the whole pile, which is generally preferable. By this method the injury to parts, not engaged in the hemorrhagic action and that give no offence, and with it all chance of further hemorrhage from the same source, are avoided. The method is very simple. There is no difficulty in everting every portion of the rectum in which bleeding from this source is likely to, or can occur, and the result is unattended with the distressing and painful endurance which is the fate of patients under more heroic treatment for hours or days after, as well as prolonged convalescence. But there is one other consideration which I beg to suggest to the profession, and upon which, from my own experience, I have arrived at a conclusion satisfactory to myself, and this is, that the modern practices preliminary to pile operations are not commendable; but, on the other hand, positively prejudicial. I refer to the advised habit of what is called "bringing down the piles," by exciting exaggerated peristalsis, so that they can be more easily manipulated. This custom is not only objectionable, in my view of the matter, in a scientific view of the process, but is calculated, in the place of furthering the objects designed, rather to embarrass the operator in prosecuting it. Stimulating injections, and enforced peristalsis to the full extent to which it can be raised by means of local digital and even instrumental irritation, are usually employed for this avowed purpose. The end—*i.e.*, the full exposure of the bleeding piles—might assuredly be otherwise gained without being accompanied by such excesses in the way of result as textural protrusion, free surface bleeding, &c., which not only obscure the diseased tissues, but disturb those ordinary conditions by the preservation of which, if possible, in a state of quiescence, surgical interference can be carried out. (Mr. John Gay, p. 188.)

*Operation for Removal of Internal Piles.*—If the hemorrhoids have been brought outside the anus by a sharp purge, followed by an enema (as should be always done), those at one side of the anus can be seized, according to their size, by one or two vulsella. If they have not been extruded, or have

returned within the orifice, they must be there sought, and brought down—a thing easily done. Great care should be taken to include as much mucous membrane as possible, *and no skin*. This precaution will make the operation much more successful and much less painful afterwards. The clamp is applied by separating the blades sufficiently widely to embrace the whole of the piles of one side, leaving sufficient space between the skin and clamp to allow the needles to pass between them without piercing the skin. The handles are now fastened, and grasped by the left hand of the operator, who thus obtains complete command of the part to be removed. The needles, armed with the finest carbolised catgut, are passed one after another, at a distance from each other of an eighth of an inch, rather less than more, keeping the needles close to the clamp. The catgut threads are detached from the needles by the finger and thumb, by a tenaculum or hook, at the option of the operator, and given one by one to the assistant, who, with one hand above and the other below, presses them against either buttock, keeping the sutures separate. It may be remarked here, that one of the duties of the assistant is to retain the buttocks as separate as possible during the whole operation. The sutures being placed, and kept gently on the stretch by the assistant, the piles are cut off smoothly, quite close to the *outside* of the clamp, the blades of which should now be unfixed and slowly separated, and any pumping artery secured and tied with the finest carbolised catgut, which is cut off at about a quarter of an inch from the knot. The clamp is now removed, and the assistant brings the whole little wound into view by gently pulling upon the sutures. Search is again made for pumping arteries; and, if there be none, the edges of the wound are brought closely together by the sutures, cleansed by a sponge wrung out of a weak solution of carbolic acid in water (one to 100), dried, and painted with collodion or styptic colloid. A suppository of two grains of powdered opium is now introduced into the rectum; and the operation is complete. If there be piles at the other side of the anus, the process has to be repeated. The after-treatment consists of the giving a grain of solid opium every six hours by the mouth, to keep the bowels quiet until the fourth day. On the fourth day, a dose of castor-oil is given, followed by an enema of warm olive-oil, which together produce an easy painless evacuation. No dressings are required beyond iced water for the first twelve hours, and then fomentations with a weak warm solution of carbolic acid (one in 150). The diet should consist, until action on the bowels has occurred, of milk and beef-tea, as leaving least residuum. The patient may be placed on a sofa on the day next after the operation. (Mr. Martin Coates, p. 190.)

"*Hazeline*" *as a Local Application in Irritable and Inflamed Piles.*—During the past few months I have given a somewhat extended trial to the new extract of Hamamelis Virginica, called "hazeline." As a local application in irritable and inflamed piles situated at the margin of the anus, where the remedy can be readily applied, I have never met with its equal. In most of the cases submitted to the treatment, the relief was immediate and permanent. My plan has been to have the part bathed in the solution three or four times a day, and a piece of lint dipped in it kept applied to the anus during the intervals. All urgent symptoms have passed away, as a rule, in from twelve to twenty-four hours. (Mr. W. H. Netherclift, Chelsea, Brit. Med. Journal, June 18, p. 965.)

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## AFFECTIONS OF THE URINARY SYSTEM.

Chronic Cystitis.—*Lactic Acid.*—Of all the acids which Dr. Deecke has tried in the treatment of chronic catarrh of the bladder, lactic acid appears to him to be the most efficacious, and to give the most durable results. His formula is as follows:—Lactic acid, one to two grams, sweetened water q. s. Dissolve. To be taken three times a day. The sweetened water may be replaced by buttermilk or a bitter infusion. The lactic acid is found in the urine after the ingestion of three or four grams. It arrests rapidly the ammoniacal decomposition of urine in the bladder as well as outside of this organ, dissolves the salts which abound there, destroys the microscopic vegetables which develop there, and in consequence acts efficaciously upon the catarrh of chronic cystitis. (Practitioner, Sept., p. 212.)

Citrate of Caffeine and Digitalis as Diuretics.—Assuming that in health the greater amount of urine is separated from the blood by filtration in the Malpighian bodies, and that "for the glandular selective function of the renal epithelium is reserved the higher and nicer work of further removing from the blood those substances which have escaped filtration," Dr. Brakenridge proceeds to show that citrate of caffeine affects mainly, if not exclusively, the latter function, in other words, that it is not a vascular diuretic but a stimulant of the renal epithelium. From careful clinical experimentation he believes that the actions of citrate of caffeine and digitalis are complementary of one another, their remarkable power when administered conjointly being due to this, and not to the increase of any action in common. The following are one or two of his practical conclusions:—1st. In cases in which the renal glandular epithelium is diseased,

is already doing a maximum amount of work, or is exhausted, this drug is unsuitable and should not be administered. 2nd. During recovery from acute desquamative nephritis, when renewal of the renal epithelium has reached a certain point, citrate of caffeine, cautiously administered, has appeared to me to have had a decidedly beneficial effect. 3rd. In such cases, as the arterial blood pressure is tolerably normal, citrate of caffeine should be given alone, not in combination with a vascular diuretic. 4th. In cases of cardiac disease, with absence of compensation, and resulting diminution in the blood pressure, and flow of blood through the kidney, general dropsy and transference of work in the kidney from the filtering to the secreting structures, a vascular diuretic, such as digitalis, must be employed in the first place to restore those conditions in the kidney which are essential to the action of citrate of caffeine. 5th. In conjunction with digitalis, citrate of caffeine is a diuretic of extraordinary power, and is particularly valuable in causing a great increase in the elimination of urea. Large doses of the drug should be avoided; one of three grains, once, twice, or thrice daily, either in pill or solution, is sufficient. (Dr. D. J. Brakenridge, p. 143.)

Hydrocele.—In a recent case I applied iodine to the interior of the hydrocelic sac in this way: Instead of drawing off the fluid by a trocar, I passed a sharp-pointed probe threaded with silk through the lower part of the swelling, and brought it out above, and allowed the serous fluid to drain away by the side of the ligature. After all the water had escaped, I moistened about an inch of the thread with iodine liniment, and by making traction on its other end the iodized portion was brought within the cavity of the sac. A little gentle friction was next used for the purpose of spreading the iodine over the secreting surfaces of the hydrocele, which, by the way, was a small one. The same process was repeated by the patient at intervals of an hour, and when, after the eighth application of iodine, sharp pain was felt, the thread was altogether withdrawn. Slight swelling and effusion followed, but a radical cure resulted. Mr. Furneaux Jordan, when submitting this mode to the profession, wrote strongly in its favour, and he considered it specially applicable to encysted hydroceles of the cord and testis, as "the walls of the cysts are usually thin, and collapse so much when their contents are withdrawn that the injection of iodine is uncertain. The end of the canula may be outside the cyst, and the iodine solution be consequently injected into the connective tissue at its exterior." With the seton this cannot happen, and in such cases as those you will find it a reliable and efficient measure. (Dr. J. C. Ogilvie Will, p. 211).

*Defer's Method of Treating Simple Hydrocele.*—Dr. Rol has much to say in favour of this method of treatment, of which he gives the following description:—The hydrocele is punctured with a canula and trocar as usual, and evacuated; through the canula is introduced a sound, on the end of which is fused a little piece of nitrate of silver; the interior of the tunica vaginalis is then rapidly touched at different points with this caustic, when the sound, and after it the canula, are withdrawn. The results of this mode of treatment are said to be excellent. Notwithstanding the occurrence of a sharp inflammation lasting five or six days, a cure is generally obtained, not by adhesion of the two surfaces of the tunica vaginalis, but by a simple vital modification of that membrane. The return of the effusion is rare. Defer's operation is thus described as perfectly safe. thoroughly efficacious, and easily performed. (Glasgow Medical Journal, Sept., p. 225.)

Modern Lithotrity.—The new and essential instrument is *the Large Catheter* (25 to 31) whether straight or curved. This is indispensable. It has an orifice at the extreme end, one side of which is prolonged so as to make its introduction easy. It has been adopted with little or no change, so far as I know, everywhere. Although my first apparatus was provided with efficient means of suction and a detached trap, neither of which was used before, its distinctive feature was the large catheter. The small size of the previous evacuating catheter delayed surgical progress for half a century. All the fragments could not pass through it, and it was impossible for surgeons to ascertaiu how the bladder would behave when once completely emptied of all fragments. Assuming all this to be admitted, let us examine the rest of the apparatus, and see how the operation is modified by it. As even a single minute fragment left in the bladder may be the nucleus of a future stone, it is important to get rid of it with certainty, and once for all. Now, although a fragment remaining in the catheter, after the bulb has ceased to expand, goes back to the bladder, yet if it has once passed beyond the catheter its return to the bladder ought to be made impossible—the surgeon should be able to secure it. And yet no evacuator hitherto devised, whether with a long or a short connexion between the bulb and the catheter, accomplishes this important end. They all inject fragments from the apparatus back into the bladder. I find by experiment that a few added inches of elastic tube make little difference. *It is from the bulb or bottle that fragments are chiefly returned, before they settle into the receiver, and not from the tubes.* To prevent this I have fixed a simple contrivance to the head of the catheter,

which is absolutely effectual in securing every fragment as it comes through it. It consists of a small light glass cylinder containing a ball-valve of rubber acting noiselessly, the valve seat of which is perforated so as to strain the return current and to keep back any fragment that has once passed it. Such a *Catheter-valve* or *Strainer*, to which I alluded in my first paper (1878), is, I think, nearly as important as the large evacuating catheter itself, of which it may indeed be considered as a part. The rest of the apparatus admits of endless variations, which are less important. If to the essential large catheter and trap we merely attach a strong elastic bulb, we have an excellent and simple instrument for a short washing or for sounding for a last fragment. (Prof. H. J. Bigelow, p. 201.)

*Lithotrites.*—Strong lithotrites are now in general use for large and hard stones, I like a large lithotrite on account of its powerful, rapid, and efficient action, but it by no means follows that it is essential to use a large instrument to break a small stone. Any small lithotrite answers for small stones. The average stone of these days is small. I always crush a last fragment with a small instrument. A large stone once broken can obviously be treated by an instrument of less size; but once in the bladder, I think the surgeon will generally continue to use the instrument with which he has successfully begun the crushing. The calibre of the blades is a question by itself. Blades may safely be large at the heel, which is the largest part, if they do not become clogged with débris, and, by their increased size, endanger the neck of the bladder while being withdrawn. If they cannot be cleared of débris they should be small. Ferguson's method of removing débris with the lithotrite is not now generally in use. No lithotrite that can be cleared is drawn out loaded. It is almost universally agreed that fragments can be removed better through a catheter than in a lithotrite. This fact has led to renewed search for a lithotrite that can be completely emptied and closed before withdrawal, without danger of impaction. It can then be made stronger and and larger—at least as large as a smaller lithotrite when it is full of débris, or of the evacuating catheter (26 to 29 French) that is used at the same time—and as it does not need to be repeatedly withdrawn to be emptied, crushing can be continued as long as it is desirable. An instrument of this kind will comminute the stone, especially a hard one, sufficiently to pass the catheters. When lithotritists, three years ago, were warning each other against the danger of fatal cystitis, which had been attested, as they supposed, by the experience of half a century, my first precaution while making experi-

ments was to protect the floor of the bladder by a solid female blade. A projecting splinter of stone, firmly set in the fenestra of an open female blade, while being crowded through it, is obviously a dangerous weapon. The blades should always be lifted off the floor as soon as the fragment is secured, before crushing it. But it is a great relief to the hand of the operator if the blades shut, at the last moment, quietly altogether. The old fenestrated instrument can be made to crush as well as cut the stone by widening the female blade and sharpening its rim inside so as to retain it. This also, protects the bladder from any scissors-like action of the of the edges. The sole of the male blade is grooved lengthwise, and serrated. In order to widen the hold upon the the stone in another way, and occupy less room in the urethra, I have used a zigzag, fenestrated blade which has proved quite efficient. I usually search for a stone with a common tin sound bent extemporaneously to suit the case, and measure it with a lithotrite, which also makes an excellent sound. The search for a last fragment or a minute calculus is best done with a small evacuating catheter by which the fragment can escape, or, if too large to pass, is arrested with an audible click. A trap and bulb are attached to it. In these days fragments are made to seek the sound rather than the sound the fragments, as has been the case heretofore. I think that the old method of sounding for a small calculus is generally abandoned, unless the calculous material is adherent or otherwise immovable. Evacuation is a simple thing, and is usually successful, even with an imperfect evacuator. To secure the water I tie an elastic band around the penis after the catheter is in place, and judge of the distension of the bladder by ascertaining, from time to time, the tension of the urethra behind it. The pumping is an easy continuous movement. There is no need of pausing after the stroke, which may be as rhythmical as the swing of a pendulum. If any pause is made, it is after compressing the bulb, to let the débris settle, when there are few left. Every fragment, sooner or later, finds the catheter, most of them at once, and with surprising readiness. The most advantageous spot, higher at first, lower when fragments become fewer, is soon discovered by trial. A quarter of an inch higher or lower sometimes makes an unexpected difference. When the fragments cease to fall into the receiver, the catheter may be immediately withdrawn. But I often add to the evacuation a thorough sounding in pursuit of a possible last fragment, which perhaps does not exist, and thereby make the operation much longer. This search can be deferred if the condition of the patient makes it desirable, although I

do not think it more important to abbreviate this surgical operation than any other. Without this prolonged attempt at complete evacuation, verified by a final careful sounding, evacuation is usually a short matter; and the number of grains evacuated in a unit of time, say in a minute, is large. (Prof. H. J. Bigelow, p. 204.)

PERINEAL FISTULÆ.—*Catheter Treatment.*—In tying in a catheter you will find the following plan a good one. Procure a flat, narrow india-rubber band, such as is sold by stationers, pass it over the glans into the groove behind the corona, and attach it to the catheter by two or more threads of well-waxed suture silk. This is a cleanly and efficient mode, and seems to be superior to plasters or tapes, which are generally recommended. Mr. Chiene's method of bladder-drainage consists in the establishment of a syphon, which he accomplishes by means of a piece of india-rubber tubing attached to a gum-elastic catheter, which is introduced so that its eye is just within the neck of the bladder, and it is kept in position by sticking-plaster. The tubing passes over the side of the bed into a bottle placed on the floor, and by filling the tube and the bottle with carbolic water a syphon action is set up. This is only a rough and imperfect sketch of the mode devised by Mr. Chiene; but you will find full details in his most suggestive paper contained in the Edinburgh Medical Journal for Dec., to which I refer you. Now, if this syphon action can be maintained we may regard the india-rubber tube as an elongation or prolongation of the ureters, for a direct and continuous connection is established between the kidneys and the recipient vessel, and the bladder ceases for a time to exercise its normal function as a receptacle for the urinary secretion. Mr. Chiene has shown that this is possible; hence we must view this new mode as a decided advance on the old one, and with its introduction the objection to the catheter-treatment must disappear; and bladder-drainage will ere long become an established practice among those who are called upon to treat cases of urinary fistulæ. (Dr. J. C. Ogilvie Will, p. 213.)

PHYMOSIS.—*New Method of Operating.*—The instrument devised for the purpose is four inches long, and somewhat resembles the ordinary mathematical dividers or compasses (see woodcut, p. 210). The legs have blunt terminations, and on their outer surfaces, for a distance of a inch and a half, are deeply serrated, with teeth set backward, to prevent the mucous membrane from slipping when traction is made. By means of the thumb-screw the blades are forced apart and retained in that position throughout the operation. The method of

using the instrument is to insert it closed within the prepuce, passing it well up to the corona of the glans. By turning the thumb-screw the blades are widely separated, thus making tense the mucous membrane. Traction is then made upon the instrument, and at the same time the outer elastic skin is drawn backward, and divided near its junction with the mucous membrane, by a circular sweep of a knife. After division, the integument is retracted, exposing to view the mucous membrane beneath, which is then freely cut with scissors quite close to its attachment to the glans, leaving only sufficient to hold sutures. To this stump of mucous membrane the cut edge of skin is attached by three or four points of interrupted suture. (Dr. R. J. Levis, p. 209.)

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## FRACTURES, DISLOCATIONS, AND DISEASES OF BONES AND JOINTS.

Antiseptic Surgery. — *Prof. Lister's Dressings.* — As he announced recently to the Clinical Society, Mr. Lister has lately been making extensive use of eucalyptol in place of carbolic acid. Eucalyptus oil itself, which is the active ingredient in all these new preparations, is a colourless, limpid, watery fluid, the essential oil of the *Eucalyptus globulus*. This is used undiluted, as a dressing in the same class of cases as carbolic oil is commonly used. It is also made into an ointment, of which the following is the formula: Vaseline, $2\frac{2}{3}$ parts; paraffin wax, $1\frac{1}{3}$ parts; eucalyptus oil, 1 part. The formula for the eucalyptus and iodoform emulsion referred to in the report of one of Mr. Lister's cases of ununited fracture of the patella, is as follows: Eucalyptus oil and powdered gum acacia, of each, 96 grains; iodoform, 8 grains; water, to 2 fluid ounces. In operations about the genital organs, or other parts where the presence of numerous hairs and their follicles makes it difficult to render the skin thoroughly antiseptic by the ordinary methods, Mr. Lister has latterly, after shaving and cleansing the parts, applied to them a "salicylic cream," which is thus prepared. Six parts of carbolic acid and glycerine (1 in 20) are rubbed up in a mortar with one part, or one part and a half, of salicylic acid, until the mixture is of the consistency of a thick smooth cream. The mode of preparation of the eucalyptus gauze, Mr. Lister intends, we believe, to make public before long; meanwhile we may say that it may be obtained from Milne, of Eagle House, Ladywell, Kent. As eucalyptol is very volatile, it is well to place in the tin box in which the gauze is kept, an open phial of eucalyptus oil, to prevent the deterioration of the dressing. (British Medical Journal, June 11, p. 930.)

*Eucalyptol versus Phenol.*—Eucalyptol is a safe and efficient substitute for carbolic acid in surgical practice. The substance which we call the oil of eucalyptus is, or was very recently, called eucalyptol by the French chemists. The term is a more convenient one than ours; and, as it corresponds with our other antiseptics—phenol, thymol, etc.—we may accept it, without inquiring too curiously as to its chemical accuracy. The substance, indeed, is only the lighter and more volatile portion of the oil of eucalyptus, which distils over at a temperature below 175° C. (347° Fahr.); a second substance passes over at a temperature of 188° to 190° C. (360° to 374° Fahr.); while a third remains in the retort. On account of the slight solubility in water and its great volatility, Mr. Lister recommends that the eucalyptol should be mixed with damar gum; but it will probably be found that eucalyptus gum—or rather resin—from which the tree derives its popular name in Australia, will be found more suitable. The French have long been employing a combination of the kind, under the name of the *Alcoolature d'Eucalyptus*, a common tincture of the fresh leaves, containing a large amount of the essential oil and resin, some tannin, and probably a little chlorophyll, as it is of a dark olive colour. (Mr. C. Roberts, British Medical Journal, June 11, p. 965.)

*Simplified Antiseptic Dressing.*—In the *Gaz. Med. de Strasbourg*, E. Boeckel described a modification of the antiseptic method of dressing wounds, which he claims to be cheaper, simpler, and more generally practicable than the "Listerian" method. The dressing used is red tarlatan cloth which has been steeped for eight days in a solution composed of Carbolic acid, 3 pts.; glycerine, 5 pts.; alcohol, 5 pts.; water, 50 pts., in a tightly covered vessel. In urgent cases, as in military practice, one or two hours steeping might be enough. The cloth is applied wet, and just before being used is dipped into tepid water to get rid of the excess of acid. Boeckel seeks to obviate the irritating effects of the acid on the skin, and also the risk of carbolic poisoning by interposing between the skin and the carbolised tissue a layer of tarlatan wetted with plain water. The margin of the dressing is rendered secure against admission of air by strips of wadding, the whole is covered with some impermeable material, and fixed with a firmly applied damp bandage. The impermeable material may be gutta-percha, paper, parchment paper, or oiled paper. The spray is only used in operations when serous cavities or joints are opened. In other cases frequent flushing of the wound with antiseptic fluid is considered sufficient. The author used this in sixty consecutive cases of major operations—*e.g.*, amputations, excision and incision of joints, and laparotomy; and

among these there were only two deaths, but in both cases the parts were "septic" before operation. (E. Boeckel, Glasgow Medical Journal, Sept. p. 227.)

*A Substitute for Carbolic Spray.*—My experiments go far to prove that, in the vapour of eucalyptus, cajuput, and other similar volatile fluids, we have powerful antiseptics, which, at the ordinary temperature of the atmosphere, may so saturate the air as to kill all infective particles; perhaps not only bacteria and micrococci, but also the germs of fevers and other infectious diseases. In a chamber regularly used for operating, there would be no difficulty in having a large pair of bellows, worked by hydraulics, to pump a continuous stream of air, which might be carried to any part of the room by means of a flexible tube; the air having been forced through two or three wash-bottles containing pumice-stone and the volatile oil, cajuput or eucalyptus. If the end of the tube have a large bell-shaped opening, the current of air will diffuse itself over a radius of many feet. (Mr. A. W. Mayo Robson, p. 171.)

*Carbolic Acid Poisoning (Surgical).*—The substitution of absolute phenol for the ordinary commercial or crude carbolic acid has in a slight measure lessened the irritating effects noticeable in the earlier applications of carbolic acid in surgical dressings. The explanation of this is, that the latter contained a homologous substance called cressol, which, while possessing antiseptic properties in a small degree, was likewise a most powerful irritant. At the outset of a case treated antiseptically there is not so much danger in using an excess of carbolic acid, for at this stage the hyperæmia so caused is rather an advantage, as it tends to promote primary union. It is in the subsequent treatment that the direct contact of the carbolic fluid must as far as possible be avoided, for it must be remembered that a very weak solution is sufficient to keep a wound once thoroughly aseptic free from suppuration. The most favourite of the practices indulged in by those whose zeal is greater than their knowledge consists in the frequent dressings and syringings of the wound, or "thoroughly keeping the limb in pickle," as I heard one of the class I refer to term it. Great surprise is shown when suppuration and probably pyæmia are induced by following out this course, and a reproach is cast on the antiseptic system. They forget altogether that the practice implies a theory, and that this over-zeal in the use of the means is the cause of the hyperæmia and suppuration, the very things the theory seeks to avoid. Especially, I think, is the daily syringing of the wound to be deprecated so long as it remains aseptic, for it completely prevents one of the greatest triumphs of the an-

tiseptic system, viz., the asuppurative organization and cicatrization of the blood-clot. Besides it complicates the treatment of the case by setting up what Professor Lister has termed "antiseptic suppuration," thus rendering the perfect drainage of the wound more difficult. We must carefully discriminate between such cases and those in which the use of carbolic acid is to blame. In a certain small percentage of hospital antiseptic cases, without any assignable cause, there occurs a rise of temperature—as much as 3 or 4 degrees Fahrenheit—due to what Volkmann calls "aseptic fever." Here, with a temperature over 100°, there is no other manifestation of constitutional disturbance; the patient is doing well, and the progress and antiseptic condition of the wound are not interfered with. This is probably a toxic effect of carbolic acid, and may be classed under the minor degress of the affection we are considering. Again, mere darkness of the urine as the result of carbolic acid, though undoubtedly a warning to the surgeon to be on his guard, is in itself a matter of no moment. I have seen more than one case progress favourably to convalescence with dark, smoky urine; but no other symptom having supervened, the changing of the dressing and the substitution of some other material was not necessitated. The use of dressings containing carbolic acid sometimes produces a form of eczema or erythema from their continued application, the effect being produced on some in a much shorter time than on others, owing to the special susceptibility or delicacy of the skin of the individual. Here, however, the condition is aggravated, if it is not caused, by the crude paraffin contained in the gauze, so it is quite possible that carbolic acid is only partly responsible for this form of irritation. The only two substitutes for carbolic acid that have been prominently advocated as open to none of the objections we have been discussing are acetate of alumina and eucalyptus globulus. A year or two ago Prof. Maas of Freiburg, on account of the poisonous effects of carbolic acid and its volatile properties, introduced a 15 per cent. solution of acetate of alumina as a cheap and efficacious agent for antiseptic dressings, and possessed of the additional advantage of inducing no toxic effects. It has not, as far as I know, been put to the test in this country, and the chief objection to it is that is only applicable in the moist or liquid form, and is useless as one of the component parts of any antiseptic dressings, for, in the dry state, it decomposes, acetic acid being given off. It is to Mr. Lister that we are indebted for the introduction of the other substitute, eucalyptus globulus. At a recent debate in the Clinical Society of London on the fatal case of carbolic

acid poisoning related by Mr. Pearce Gould, and to which I have already alluded, Mr. Lister recognised the necessity of being possessed of a suitable material to employ in those cases where grave symptoms occurred owing to the toxic and irritative effects of carbolic acid dressings. This agent, he says, he has found by experiment to be a perfect antiseptic, and quite free from any unpleasant results, owing to its bland and unirritating properties. It cannot however, be used as a lotion, as the oil of eucalyptus does not mix with water; but he has prepared a gauze by a process similar to that by which carbolic gauze is prepared, in the proportion of one part of the oil of eucalyptus to three each of paraffin and dammer gum. This preparation he has found to be a very efficacious one, and in his opinion, ought to be very suitable in the class of cases where the idiosyncrasy we have been discussing occurs. (Dr. S. Rutherford McPhail, p. 161).

COMPOUND FRACTURES—*Glycerinum Acidi Carbolici.*—In a case of compound fracture of the tibia, at the junction of the lower and middle thirds, a large quantity of blood having been lost from a small wound caused by the upper fragment of the tibia being driven through the skin, I bound it up temporarily, to arrest the bleeding. After about twelve hours, when the bleeding had at length quite stopped, the temporary dressing was removed, and a pad of lint soaked in collodion applied. This pad remained on for two days, when it became partly detached, and free oozing of bloody fluid commenced from the wound. I now applied a pad of four thicknesses of lint saturated with glycerinum acidi carbolici to the wound, and a few turns of bandage over it, so as to keep it in its proper position. The lint became firmly adherent to the wound, and the next day I applied a larger pad of four thicknesses of lint soaked in the same way over the original pad, so as to keep it still saturated. On the third day afterwards I cut the edges of the two outer layers of the pad next the wound, and removed and soaked them with glycerinum acidi carbolici, and then reapplied them, and then the bandage as before. I regard it as of much importance to the success of this plan of treatment not to disturb the layers of lint immediately covering and generally attached to the wound. After this treatment had been continued about ten days, a large blister containing dark fluid formed under the pads and showed at their edges. I now cautiously tried whether the under pad was still adherent, and finding it was not, I removed it and found that the wound had healed. I left the blister exposed to the air, and it dried up in a few days. The remaining progress of the case in no way differed from that of one of simple fracture, and the man ultimately completely recovered. (Dr. F. C. G. Griffin, p. 155.)

DISLOCATION OF SHOULDER JOINT.—*Simple Method of Reduction.*—Supposing the left limb to be dislocated, the surgeon standing on the affected side of the patient grasps the limb at the elbow-joint with his right hand, and places the thumb of his left hand on the misplaced head of the humerus. Abducting the limb from the side, and making a fair amount of extension, he now calls away the patient's attention from himself so as to relax the muscular system in some measure, and, taking advantage of this relaxation, he rotates the limb externally, aiding the reduction by, at the same time, pressing with his left thumb on the misplaced head of the bone. The only difference when the right is the affected side is that the operator's hands have to be transposed. (Dr. S. R. McPhail, Lancet, May 28, p. 896.)

HOUSEMAID'S KNEE.—This, as we all know, is a very obstinate complaint, and may have resisted perfect rest, blistering, and a variety of other treatment. If it has existed any length of time we find that there is not only effusion of fluid into the synovial sac, but inflammatory thickening of the surrounding tissues. Now, I find that if we make a puncture in the sac through the skin with a tenotome and introduce a little drainage-tube not bigger in calibre than a crowquill, at the same time doing this in such a way as to prevent the entrance of putrefaction and employing an efficient antiseptic dressing, we may reckon on it as a matter of certainty that the disease which has been previously so obstinate rapidly becomes cured. We change the dressing in the course of a day or two in order to shorten the tube, and at the next dressing we probably find the serous oozing has been so slight as to permit us to dispense with the tube altogether, and within a week or ten days the little puncture is healed. Meanwhile, not only is there no reaccumulation of fluid, but the thickening of the surrounding tissues disappears rapidly, and before long vanishes altogether. (Prof. Lister, p. 154.)

JOINT AND BONE TUBERCULOSIS.—*Iodoform.*—At the recent Surgical Congress, held at Berlin, Dr. Mikulicz read a paper on Iodoform as a Dressing in Joint and Bone Tuberculosis, &c., which was a short but interesting report of a series of thirty-six cases occurring in Prof. Billroth's clinic, where this treatment was used. This series includes cases of disease of nearly all the large joints, the hip, knee, ankle, elbow, &c., and many chronic abscesses connected with diseased bone. This form of treatment was first proposed by Prof. Mosetig-Moorhof, of Vienna, where the method has been quite generally adopted with the most satisfactory results. The use of iodoform as a dressing of unhealthy wounds has long prevailed,

but now it is used somewhat differently, and much more thoroughly. In joint diseases, caries, old abscesses, &c., the diseased bone, fungous granulations, and other abnormal tissues are removed with knife or curette, the cavity thoroughly washed out with carbolic acid or thymol, and *entirely filled* with iodoform. A usual dressing of gauze and Mackintosh is then applied over all, and the part immobilised by means of an organtine bandage. Unless the discharge soaks through the dressing it is not removed for one, two, or even three weeks. The results obtained have been remarkably good, cases having been cured that would have been amputated under the older methods of treatment. The iodoform diminishes the secretion, prevents its decomposition, and prevents the formation of tubercle in the granulations or destroys them if they are already present. This specific local action on tuberculous granulations has been repeatedly observed, portions of the tissues being examined microscopically before and after its use. This may easily be observed where the granulations have not been first removed. This observation of the action of iodoform upon tuberculous masses with which it is in contact, led to the trial, in Prof. Billroth's clinic, of injecting an ethereal solution of iodoform into joints in the early stages of fungous inflammation, and into other suspected tuberculous swellings. A solution of iodoform in ether, one part to five, is injected with a hypodermic syringe directly into the joint or tumour in several places, one or two syringes full being used. The ether is immediately absorbed, and the iodoform is left in substance in contact with the diseased tissues. This method has been too short a time in use to allow judgment to be passed on its merits, but in the large number of cases where it has very recently been tried, no inflammation or irritation has followed, and in some cases there has been a decided decrease in the swelling. Iodoform is also used in all wounds connected with the mouth, intestine, rectum, vagina, &c.—in fact in all places where a disinfectant and antiseptic is needed where carbolic acid cannot conveniently be used. Thus, in recent tongue and partial larynx excisions, and in cancers of the mouth, iodoform has been used as a dressing, a piece of gauze plentifully sprinkled with the powder being packed against the wound. This completely checks all tendency to decomposition of the secretions, and no odour can be perceived, thus rendering unnecessary the hourly washing out with permanganate or carbolic solution. Iodoform is apparently absorbed but little, and no toxic effects have been observed beyond a slight nausea in thirty-six to forty-eight hours in a few cases, even this symptom immediately disappearing. Dr. Mikulicz described a series of

experiments made by him on the antiseptic action of iodoform. He found that when added to urine or solutions of animal matter it did not entirely prevent the formation of bacteria, but the solutions remained without smell or signs of decomposition. In blood the bacteria appeared in smaller numbers, and much more slowly, probably on account of the solution of a part of the iodoform present by the fatty matter contained in the blood. Prof. Gussenbauer spoke of nineteen cases in which he had resected the larger joints for disease, the after-treatment being with iodoform. In one case the whole calcaneus was removed, and the cavity filled with two hundred grammes of iodoform. The dressing was changed but once a month, and the wound healed. He considered his results in these cases much better than could have been expected with the usual treatment. (Dublin Journal of Med. Science, Sept. p. 286.)

Sponge Pressure as a Surgical Dressing.—We have hitherto laboured to invent dressings which shall absorb the discharges; what we have to do is to devise dressings which shall render discharges unnecessary. Consider for one moment what it is you desire to do in arranging a stump after amputation. Do you not wish to place the entire wound surface in intimate apposition, and to maintain it so until it has adhered together? If this be so, you can imagine how little likely your ordinary dressings are to carry out your intention. You leave large spaces in the cavity of the wound, particularly at the angle where the bone is situated, and you leave loose connective tissue everywhere, both of which will quickly become occupied by effusion from the vessels. Clearly what we have to do to secure our end is to employ dressings which will exercise a sustained external pressure sufficient not only to bring the opposite surfaces immediately into contact, but also for the time being to obliterate the cellular spaces of the connective tissue, and to prevent the subsequent effusion of blood or inflammatory products. As regards the arrest of hemorrhage in this way, your every-day experience will remind you that it is easily enough accomplished, and we need not therefore pause to consider it. But as regards the prevention of inflammatory exudation by pressure some theoretical objections will probably occur to you. Remember, however, that we are not dealing with tissues already the seat of inflammatory disturbance, but with tissues in their normal condition, and that we seek to prevent even the first step in the process. That this may be accomplished by means of pressure, in certain cases, is evidenced by the treatment of fractures and sprains by the early use of judiciously applied compresses. For some

years past I have been endeavouring to dress wounds with the end in view which I have enunciated, and not to take up time with the record of failures, I find now that I have so far succeeded that I am justified in bringing my present method under your notice. I have found that by the use of sponge bandaged over the surface of the stump or other part one is often able to secure perfect union of a wound without discharge and without the need of changing the dressing until the union is complete and sound. Sponge, as you know, is a material which is readily compressible into a very small bulk, and which also possesses a high degree of elasticity or resilience, so that pressure being removed it immediately resumes its former size and shape. Besides this, its highly absorptive properties, which are commonly taken advantage of in surgical practice, are well known to all of you. For these reasons sponge appeared to be a material well adapted for the purpose I had in view, first and chiefly, to exercise a continuous and elastic pressure, and, secondly, to absorb readily any discharge which might perchance escape from the wound. The sponge I have hitherto mainly employed has been the large-celled honeycomb, and the manner in which I used it is briefly as follows. Antiseptic precautions are used throughout. All bleeding points are carefully closed. Frequent sutures are inserted, so as to bring the edges accurately together. No drainage is used. The sponge, having been soaked in carbolic lotion, is squeezed tightly to expel every drop of superfluous moisture. The flaps of the stump are meanwhile carefully pressed together by the surgeon in order to force out any blood which may have collected during previous procedures. And let me urgently draw your attention to this point, since want of thought about it will frequently cause disappointment. However carefully you may close all bleeding points in an amputation, in nine cases out of ten you will find that after closing the wound some further hemorrhage will have taken place. Possibly this may be from the surface of the flaps: very probably it may be from the needle punctures. But be that as it may, to leave this blood in the cavity is to court failure. Diligently compress the flaps together with your fingers, and so squeeze out every drop of blood; then relax not your hold for an instant, but skilfully place the compressed sponge over the surface, and hold it, and as many more sponges as may be required to cover the entire surface, tightly with your fingers, while an assistant secures them in place with a bandage. Sometimes this is rather difficult to do, but by stitching sponges together some assistance may be gained. The bandage having been applied, you may now cover the whole with anti-

septic gauze, or with tenax, with a piece of macintosh over all; these again are secured with another bandage. In many cases it is advantageous to use as a bandage a piece of elastic webbing. This you may do if you choose. (Mr. James Hardie, p. 166.)

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## AFFECTIONS OF THE SKIN, ETC.

Acne.—Though not ignoring the influence which constitutional states excite in acne, many cases can be successfully treated by local measures exclusively. In the inflammatory group, when there is much pus formation, open freely but gently the little acne abscesses with a small and very sharp knife. To promote absorption of the sluggish copper-coloured tubercles, and stimulate without producing caustic action, the best agent is carbolic acid, applied by means of a glass rod or stick dipped into the liquefied acid, sopping up any accidental excess with blotting-paper, and then covering each carbolised spot with a film of flexible collodion. This both protects from the air, and also, forming a colloid compound with carbolic acid, minimizes its irritant action. At times two or three applications will serve to remove the most disfiguring part of the disease. To expedite the cure it is often serviceable to dust the face at night with precipitated sulphur by means of a puff, washing it off in the morning. If the skin is irritable or inflamed, nothing is more soothing and grateful than to wash the face with rice milk prepared by boiling, say, a teaspoonful of ground rice in half a pint of new milk. This emollient is advantageous where bran or oatmeal tea are useless or cause irritation. Acne on the dorsal region needs and admits of more active measures, as diligent frictures with soft soap, or, what has been found to be a cheap and capital substitute, Hudson's extract of soap. As a *soothing* lotion the following is useful: ℞. Zinci oxidi, ʒ ij; glycerini boracis, ℥j; spt. cajup., ʒ jss; lin. calcis, ℥v. M. As a *stimulant* application: ℞. Sulph. præcip., gr. xx; hydrarg. ammon., ʒ ss; vaselini, ʒ iv; ol. amygd. amar., ♏iij. M.—*Or*, ℞. Glycerini acid. carbol., ʒ ij; sulph. præcip., ʒ ss; sapo mollis, spt. vin. rect., āā ʒ j; ol. amygd. amar., ♏iij. M. (Dr. Walter G. Smith, p. 254.)

*Acne Punctata*—The first indication for treatment is to get rid of the sebaceous plugs, which may be accomplished either by direct pressure or by lotions which will dissolve the sebaceous matter. The latter is the only available method when the acneous spots are numerous. The best lotion of this kind is one of borax in water (1-5 per cent), with a little sulphuric

ether added. The parts should also be washed every morning with very warm water, ammoniacal or slightly alcoholised, to stimulate the skin. When the functions of the glands have in this way been regulated, the secretion may be modified by the employment of astringent lotions of tannin, alum, peroxide or perchloride of iron, &c. (M. Hillairet in Prog. Médical; Glasgow Medical Journal, July, p. 42.)

ALOPECIA.—*Pilocarpine*—A woman consulted Dr. André on account of complete baldness which had developed without any apparent cause. She had lost not only the hair of the head, but also the eyebrows and eyelashes, with the axillary and pudendal hair. Subcutaneous injections of hydrochlorate of pilocarpin were practised on the scalp. The effects of the first injections of 1 cgrm. of the drug were very well marked, but they gradually diminished in intensity. A sensation of pricking was produced on the skin, which soon swelled and became bright red, and, within three minutes, drops of perspiration exuded from the skin. At the same time there was a vivid sensation of burning, with hyperæsthesia of the skin lasting ten or twelve hours. About a month after the first injection the hair was sprouting freely, and three months later, after ten injections, the head was abundantly covered with hair 2 cm. long. At the same time the eyelashes and the axillary and pubal hair reappeared, and later on the eyebrows. (Dublin Jour. of Medical Science, June, p. 542.)

BAD COMPLEXIONS.—Acetic acid in a dilute form renders albuminous tissues transparent, but it has not much effect on the outer horny layer of the epidermis; it appears to penetrate more deeply, absorbs water from the rete cells, and like the alkalies, induces desquamation, but more gradually, and from within outwards. Unna has very successfully applied this to the treatment of "a bad complexion." Where there is some degree of acne punctata and comedones, he employs a paste consisting of four parts of kaolin, three of pure glycerine, and two of vinegar. When this is smeared on the face under such circumstances, the eyes being kept shut during its application, it dispels the acne and comedones, wonderfully clears up the muddy complexion, and prevents the simpler form of acne from advancing to the graver. (Dr. W. A. Jamieson, p. 241).

BURNS.—*Liniment of Sugar and Lime.*—Recognising the efficacy of our *linimentum calcis*, M. Constantine Paul prefers to it a liniment of sugar and lime, which is prepared in the following way:—Equal parts of sugar and slaked lime are pounded together in a mortar, and to this a small quantity of water is added from time to time till the mixture becomes

very liquid. After forty-eight hours it is filtered, and then evaporated to the consistence of a thin syrup. This is then mixed with equal parts of a liquid consisting of one part glycerine and three parts of oil. For this liniment is claimed the advantage of containing a larger proportion of lime than the same volume of the "Carron mixture." (Glasgow Medical Journal, May, p. 405.)

Eczema.—*New Antipruritic Remedy.*—Gelsemium is recommended by Dr. Bulkley, of New York, as a remedy possessing antipruritic powers, its use being suggested to him by its well known physiological actions, its power of producing a sensation of numbness of the skin, and a certain general languor and relaxation of the muscles. Dr. B. has prescribed it for some years, chiefly in eczema, and so far only in adults. He always employs the tincture, beginning with a dose of 10 drops; in half-an-hour this is repeated if necessary, or 12 to 15 drops may be given, and so on till results are obtained, or till a drachm has been taken in two hours. (Dr. L. D. Bulkley, Glasgow Medical Journal, July, p. 47.)

*Eczema of the Anus and Genital Regions.*—Dr. Bulkley states that the first indication of treatment is to relieve the constipation which almost constantly accompanies eczema of the anus. When there is congestion of the hemorrhoidal vessels he orders precipitated sulphur and bitartrate of potash in equal quantities, and directs that from one to two teaspoonfuls be taken at night on retiring, rubbed up with water into a paste. The dose is not a pleasant one, he adds, but it is effectual. Next to imperfect bowel secretion is deficient kidney action, and the author finds the best results from the use of ℞. Potass acetatis ʒj; tinct. nucis vom. ʒij; infus. quass. ℥iv. M. Sig: A teaspoonful after meals, in water. For the relief of the intolerable itching the patient is recommended to sit on the edge of a chair, and have a basin full of water so hot that the hand cannot wholly be thrust into it. A soft handkerchief is then squeezed out of the water and held in a mass against the anus, and genital parts, for as long a time as it can be borne; it is then to be dipped in the water again, and the process repeated three times, the whole not lasting more than two or three minutes; since too long bathing or too frequent sopping of the parts makes matters worse. The parts are then to be rapidly dried by pressing a large soft linen napkin upon them, with absolutely no friction; after which they should be wrapped in lint smeared with an ointment which must vary for each case, but which most usually takes the following form: ℞. Ungt. picis ʒj; zinci oxidi ʒij; ungt. aq. ros. (U. S. P.) ℥iij. M. Lotions

are of much service, especially in eczema of the penis and scrotum, and the following can be recommended: ℞. Bismuth. subnitr. ʒ ij; acid. hydrocy. dil ʒ j; emuls. amygd. ℥iv. M. fiat lotio. (Dr. L. D. Bulkley, Practitioner, May, p. 380.)

*Eczema Genitalium.*—Dr. Finny finds lotions often suit better than ointments, and gives the following two useful formulæ:—℞. Lin. calcis. ℥iv; ext. bellad., gr. xij; zinci oxidi, ʒ ij; glycerini, ʒ j; aq. calcis. ℥iv. To be applied at night, after bathing the scrotum in very hot water. During the day, dust with a powder composed of bicarbonate and oxide of zinc and starch. Another formula useful in eczema rubrum vulvæ is—℞. Lin. calcis, ℥iv; acid. hydrocyan. dil., ʒ iv; liq. plumbi subacet. ʒ ij; glycerini, ʒ ij; aq. rosæ, ad ℥viij. Pruritus ani is often associated with eczema genitalium, and may be its starting point, and hence it is well to look for fissure or ulcer of the rectum or hemorrhoids. (Dr. Magee Finny, p. 247.)

Frequently Recurring Erysipelas of the Face.—This affection is very annoying to the patient, for, in spite of every precaution, it will recur again and again. If any cause can be discovered, such as bad drainage, it should at once be remedied; but, whatever other hygienic or medical treatment be employed, some local application is generally necessary. All these applications are either disfiguring or disagreeable, or totally inefficient. For many years, my father and I have used with entire success a strong solution of tannin (four to eight grains to the drachm of spirits of wine and water.) This application, which is not disagreeable to the patient, should be painted over the parts affected with a soft brush every two or three hours, and allowed to dry, the patient being careful to keep the face from the fire. If there be a tendency to frequently recurring erysipelas, it is well to keep the tannin at hand, as it will always arrest a threatened attack. (Dr. James Braithwaite, British Medical Journal, April 30, p. 681.)

Fœtid Sweating of the Feet.—Dr. Thin states that this affection is caused by the rapid development of bacteria (*bacterium fœtidum*) in the fluid which exudes from the soles of the feet; the results of his investigation on this subject were communicated to the Royal Society. The treatment he advises is simple and effective. The stockings are changed twice daily, and the stocking feet placed for some hours in a jar containing a saturated solution of boracic acid; they are then dried, and are again fit for wear. The acid destroys the smell. Cork soles must also be used, as the leather in the

bottom of the boots also smells badly; half-a-dozen pairs should be kept in use, each pair used only a day at a time, and treated with boracic acid as in the case of the stockings. (Dr. G. Thin, Glasgow Medical Journal, July, p. 47).

My attention has been drawn to the subject of a very distressing, and, I hope, very rare affection of the feet—viz., fœtid sweating. I have never forgotten a very severe case of this disease which occurred many years ago in Yorkshire. The subject was a boy, aged about 14, whose health was constitutionally delicate, though otherwise sound. He wore cotton socks, and these used to be simply soaked through and through with the most fœtid perspiration, rendering it it an infliction to be in the same room with him. In this case, a perfect cure was effected (after many remedies had been unavailingly tried), by making him wear fine soft lambs' wool socks, changed frequently. No other remedies, beyond a nourishing diet and out-of-door exercise were used. After the commencement of the change of socks, as above described, the cure was speedy and permanent. (Mr. T. Cayley Hutchinson, British Medical Journal, Nov. 6, p. 765).

Freckles.—The following formula is said to be efficacious for the removal of freckles. ℞. Hyd. bichlor. grs. vj; acid muriat. dil. ʒ j; aquæ, ℥iv; alcohol, ℥ij; aq. rosæ, ℥ij; glycerinæ, ℥j. M. Apply at night and wash off with soap in the morning. (Canada Lancet; Practitioner, Aug. p. 137.)

Impetigo Larvalis.—*Powder of Iodoform.*—Dr. Squire employs iodoform in that form of impetigo which is characterized by mattery yellow scabbed patches occurring on the faces of children and young adults. He was led to the use of this remedy by observing that the raw surfaces concealed by the scabs, although not ulcers, had yet certain points in common with that class of ulcers which iodoform is specially successful in healing: namely, that they present a sodden false membrane-like surface, which discharges copiously a milky pus. The method adopted was to remove the scabs and dry the sores with rags, after which they were dusted with a mixture of iodoform (in very fine powder) and starch powder in equal parts; as the surface begins to present a florid and clean appearance the iodoform powder is used undiluted. Very rapid improvement takes place under this treatment. The mere dusting over of the raw surfaces with the powder does not, however, of itself suffice; since if this alone be done, the surface speedily dries up again; that is to say a thin, hard, dry scab is immediately formed, and this cracks, and so produces an uncomfortably tense condition of the surface, which is not only extremely irksome to the patient, but also highly

unfavourable to rapid healing. It is therefore well to coat the powdered surface with a thin film of glycerin. The conditions which have to be observed are: 1. The scabs are to be softened by bathing them with warm soap and water, and then completely detached and removed, and thereupon the raw surface is to be gently dabbed dry. 2. The iodoform is to be in a very fine powder and freely dusted on. 3. A layer of glycerin is to be lightly laid over it. The process should be repeated, if possible, every two hours by the patient himself; or if a child by his nurse. Under these conditions the disease in many instances within a day or two exhibits a very remarkable improvement, and speedily becomes healed. A moderate dilution of the iodoform with starch powder will render it quite a comfortable application in cases where it would otherwise cause irritation. (Dr. Balmanno Squire, Brit. Med. Journal, May 14.)

Irritation of Skin.—The late Dr. Tilbury Fox insisted particularly on the use of soothing remedies in various forms of skin disease where there was irritation to be allayed. These may consist of substances in the state of powder, as the carbonate and oxide of zinc, bismuth, chalk, &c., suspended in water, to which a little glycerine has been added. Glycerine when so used must be the best and purest, free from fatty acids, and must be well diluted. Pure glycerine undiluted is an irritant, freely diluted with water is an emollient, and the best remedy we have for that dry and fissured state of the cuticle occurring in the hands and face and legs during frost or when east winds are prevalent. The same softening effect is produced when glycerine and starch are combined in the glycerinum amyli of the Pharmacopœia, the starch here serving both to dilute the glycerine and also to impart its own demulcent properties. (Dr. W. A. Jamieson, p. 240.)

Itching.—In nearly all cases itching is a symptom of superficial irritation. When, as in urticaria, too rapid a flow of blood through the skin seems to be the cause, all means which keep the body cool diminish this symptom. Hence the value of vinegar or alcoholic lotions, which promote evaporation from the surface, and the disuse of flannel, which, being a non-conductor, hinders exhalation, while its rough texture stimulates the skin and favours congestion. Then we have remedies which coagulate the albumen of the tissues, as carbolic acid and tar, and thus deaden sensation; both penetrate a short way into the epidermis, and while carbolic acid is the more rapid in its action, it is, from its volatility, also the least permanent. Camphor has long been known as an antipruritic of some value, but when combined with chloral

hydrate, forming a liquid, its efficiency is much increased. It may be painted on pure, or used diluted with two or three parts of vaseline. Thus employed it forms one of the best means we possess for the relief of pruritus podicis, when this does not depend on ascarides or any plainly evident cause. But it occasions pain when applied to a part denuded of epidermis. Itching which owes its origin to too slow a current of blood, of which the most typical example is that seen in eczema connected with varicose veins of the leg—but to the same category also many examples of pruritus scroti, labiorum and ani may be referred—is best relieved by careful flannel bandaging, well applied suspensory bandages, and laxative salts or mineral waters, which unload the rectal veins by freeing the portal circulation, combined locally with weak tarry lotions, one of the best of which is Wright's liquor carbonis detergens, a well-made alcoholic solution of coal-tar, suitably diluted. (Dr. W. A. Jamieson, p. 238.)

Lupus, Rodent Ulcer, Epithelioma of the Lip.—*Scraping by Volkmann's Spoon, or Dermal Curette.*—The value of this mode of treatment in suitable cases and forms of disease can scarcely be over-estimated. The spoon has this great advantage, that the surgeon while using it can tell exactly by his sense of touch when the limits of disease have been reached, and healthy or little diseased tissue is being encroached on. The diseased parts in *lupus* break down with the utmost readiness under the spoon, while the sound parts offer an almost unconquerable resistance. Indeed with the spoon one can scarcely do too much, one is far more likely to accomplish too little. The cell-growth, infiltrating itself along the vessels, penetrates beyond the reach of scraping, and thus demands other measures for its removal. Though a painful operation at the time, necessitating the employment of anæsthetics for its efficient performance, the pain ceases at once after scraping has been discontinued. It is a bloody operation, but the bleeding is arrested with the utmost ease by pressure. A thin slough separates, then a clean healing surface is left, which generally cicatrizes over readily. Islets of disease are left here and there, however, at the margins of the patch, and within its area, where the cell-growth has penetrated more deeply, perhaps along the vessels of a peri-glandular plexus, or by the communicating vessels which unite the superficial and deep horizontal layers of cutaneous blood-vessels. These are best treated by making many minute punctures with a fine knife, which stimulates absorption by causing small hemorrhages into the tissue. These occurring suddenly, excite the tissues to reaction, as

an effect of which blood-clot and cell-growth simultaneously are removed. The scar resulting from a successful scraping is smooth, soft, and little if at all depressed below the skin which surrounds it. Equally well suited for scraping are the superficial epitheliomata of skin and accessible mucous membranes, as the lip. In this way the early stages of *rodent ulcer* can be most satisfactorily treated. These forms are usually long, many years often, before they infect the lymphatics, and may be radically cured by scraping. I have in this way treated several cases of rodent ulcer on the upper part of the face and *epithelioma of the lip* without recurrence, though years have passed, while the resulting cicatrix was in every way satisfactory. Primary sarcoma of the skin, a rare disease, can be treated by scraping, but from the nature of the morbid growth relapses are more apt to occur than in superficial epitheliomata. In spindle-celled sarcoma, too, the growth resists the spoon, and is by no means so readily removed. It is the custom of some American dermatologists to sear the raw surface with the thermo-cautery after scraping lupus. I have no personal experience of this, but it is certain that there is here again the risk of doing too much by destroying minute areas of healthy tissue, while even in this way we cannot follow the finer ramifications of the disease. The application of a strong solution (40 grains to the oz.) of chloride of zinc to the scraped surface may possibly have some advantage, since it has some penetrating power, but it gives rise to acute biting pain for hours, and does not certainly preclude relapses. Small fresh spots of lupus, appearing as little red jelly-like nodules rising up from the corium through the epidermis, are admirably treated by the plan suggested by Auspitz. A thickish needle or hiss puncturing instrument is dipped in iodide of glycerine, one in twenty, and this is plunged into the nodule; slight inflammatory action is set up, and the lupus deposit withers up and disappears, leaving scarcely a trace. (Dr. W. A. Jamieson, p. 243.)

*Scraping and Puncture in Lupus.*—The second mechanical method employed by Volkmann in the treatment of lupus, is that of "Multiple punctiform scarification." He employs it 1st, to destroy newly-formed vessels. 2nd, to favour absorption of neoplasm by traumatic irritation of the part. It is practised by making hundreds or thousands of punctures close together, about two lines in depth. For this purpose a narrow-bladed bistoury may be used, or the same end gained in less time by by employing an instrument composed of two or more knives set close together. This treatment is more applicable to non-

ulcerated parts where the cell-infiltration is diffuse, or where the part is abnormally swollen and vascular. Such tissue might in some cases be made to break down under the spoon, but less scarring or deformity results if the neoplasm can be made to disappear by the puncture method. (Dr. A. Sangster, p. 248.)

Molluscum.—*Internal Use of Iodoform.*—I have lately administered iodoform internally with complete success in an obstinate case of molluscum, where a prolonged course of arsenic and a variety of other remedies failed. It was given in one-grain doses three times a day. I found that the most agreeable way of giving the medicine was in the form of sugar-coated oval pills, procured from Messrs. Burroughs of Snow Hill. (Dr. W. J. Eames, British Med. Journal, June 11, p. 965).

Psoriasis. — *Chrysophanic Acid, Chrysarobin, Pyrogallic Acid.*—We owe to Dr. Balmanno Squire the introduction of chrysophanic acid as our most efficient remedy in relieving psoriasis. Both Dr. Squire, however, and Dr. James Adams, who wrote an excellent paper on it in the Edinburgh Medical Journal, recommended much too strong an ointment. Dr. Squire still adheres to a formula of two drachms to the ounce. This may do all very well for some pachydermatous people, whose skins react little to irritants, but in general from ten to fifteen grains in the ounce of vaseline is potent enough. Messrs. Macfarlane sent me a specimen of what they called chrysarobin; whether this differs in aught from well prepared chrysophanic acid I do not know, but it seemed to me, while equally efficacious in curing (for the time) psoriasis, to be less apt to induce the troublesome and alarming erythema, which so often follows too energetic a use of chrysophanic acid. In employing chrysophanic acid for psoriasis it should be remembered that a little of the ointment well worked into the patches, previously cleared of their scales, does infinitely more good and less harm than a great deal dabbed in. Alizarin, suggested by Dr. Adams as a substitute for chrysophanic acid, on ingenious chemical grounds, does not appear to have found much favour, but pyrogallic acid introduced by Jarisch has been of more value, though not well adapted for application to extensive surfaces. Since it does not irritate and inflame the conjunctivæ, it is better suited than chrysophanic acid for psoriasis affecting the scalp and face, and may be used in the strength of one drachm to the ounce. Besides its value in psoriasis, pyrogallic acid seems also to exert a slowly destructive action on some forms of new growth, especially those which are allied in a somewhat

*Iodoform in Skin Diseases with Excessive Secretion.*—The favourable results obtainable from using iodoform, as an external application in the treatment of cutaneous diseases, attended with excessive secretions, are so decided, that I feel convinced it will soon come into general use. It has been employed by me extensively, in private practice, for upwards of a year; and I am assured, by continued observation, of its safety, and the great advantages resulting from its action. It may be easily applied in ointment of any desired strength, mixed with either lard or vaseline; and it appears impossible to claim for either a decided preference. The strength of the ointment made use of has ranged usually from ten to thirty grains of iodoform to the ounce of cerate, but double this quantity can be applied. It has proved a most useful remedy in healing local eczematous eruptions, occurring in strumous children and young people, and in cases of impetigo; and I have also treated with it several unhealthy ulcers with fair success. I feel also desirous of directing special attention to the properties it possesses of promoting the cure of that very troublesome affection, porrigo decalvans. The best results that I have as yet obtained in this disease, have followed the application of vesicating collodion over the affected spot, and for a short distance around it. Previous to this it is well to epilate all diseased hairs over the spot; and, when the blister is healing, the ointment of iodoform should be applied night and morning, or oftener; and, by this treatment, the hair soon reappears in a healthy condition. (Mr. Frazer, p. 234.)

*Oil of Ergot in Skin Diseases.* — Dr. Shoemaker has obtained excellent results from the use of the oil of ergot in the treatment of the acute variety of *eczema*. He finds that it is particularly valuable in that form in which the part is hot, tumefied, and covered with small vesicles, some of which have burst, and the fluid coming in contact with the surrounding parts has caused considerable irritation. It is also a most useful application in *eczema of the lips*, in which the surface is tumefied and fissured, bleeding readily upon slightest movement of the parts. It is efficacious in *cracked nipples* and in *herpes of the genitals*, as well as in checking the formation of scales in *seborrhœa* of the scalp and other hairy parts of the body. As a local application in *erysipelas*, oil of ergot is also of great service. In *rosacea* after making punctures over the patches with a needle knife and allowing the surface to bleed freely, the application of oil of ergot will soothe the part, constrict the blood-vessels, and thus greatly modify the diseased action. The remedy is equally serviceable in diseases of the mucous membranes, and has

been found of use in *catarrh of the nasal passages*, in *ulceration of the cervix uteri*, and in *gleet*. The oil of ergot may be prepared by the addition of benzine to ergot, and afterwards allowing the benzine to evaporate. The substance thus obtained is a moderately thick, reddish-brown fixed oil, with a slight odour of herring pickle, and an acrid taste; it is soluble both in alcoholic and alkaline solutions. (Dr. Shoemaker, Practitioner, Aug., p. 138.)

Skin Grafting.—Given a case where skin grafting is desirable, the first and most essential condition to ensure success is a healthy state of the granulations. To procure grafts I generally select the anterior aspect of the forearm, where I find there is least pain, and usually proceed according to the directions given by Mr. Bryant in his admirable work on surgery. Instead, however, of using the instrument he recommends, I catch directly and nip off, with an ordinary curved scissors, a small oblong piece of skin, about a quarter of an inch long, taking care not to cut too deeply into the cutis vera, a very thin layer of which will suffice. If done dexterously, including only the cuticle with the *rete mucosum* and the mere apices of the papillæ, the pain is very trifling. There is no bleeding, and the patch heals without any treatment. On my thumb-nail, I divide this piece into about four parts, taking care not to bruise or otherwise injure the grafts. They usually curl up, and I catch each gently, by its outer surface, on the point of a tenaculum needle, to which it adheres almost without pressure, as if by attraction. The sore having been washed previously with carbolised water, I lay the raw side of the graft on a good ruddy granulation, to the convex surface of which it will immediately adhere, if *lightly* taken on the tenaculum. The curled graft at first does not lie evenly, but by a little gentle continuous pressure with the curve of the tenaculum, it quickly absorbs moisture from the granulation, loses its shrivelled appearance, unfolds itself, appears to get larger and fuller, and in a few seconds lies evenly on its new bed. Bleeding the granulations, as formerly practised, is not necessary. Indeed, I believe it rather tends to mar the success of the operation. The other grafts should be placed with similar care. I place them half an inch apart, and about the same distance from the margin of the sore, covering with successive rows of grafts the entire surface, unless it be exceptionally large, in which case I leave the centre free, as the grafts here will not take so readily. I believe to be an advantage to place a sufficiently large number at one operation. It generally obviates the necessity for a repetition; and, if such can be avoided, it is better not

to subject the patient a second time to even the trifling pain experienced. With due care it is quite as easy to get a large number to take as a few, especially if the grafts be placed in wide sores chiefly around the margin. The more numerous these "centres of cutification," the greater will be their effect in exciting cicatrisation at the margin (a power which any ordinary observer must admit they undoubtedly possess), and the more quickly will they unite and cover in the sore by proliferation of their own cells. The grafts having been placed, it is of the utmost importance to keep them undisturbed *in situ*. I cover the sore carefully with a piece of fine gutta-percha tissue, previously rubbed with carbolic oil, placing over this a small pad of French wool to secure equal pressure, the whole being lightly strapped with adhesive plaster, and bandaged. On the third day I expose and wash the surface very carefully with tepid, carbolised water. Other methods, such as keeping the grafts *in situ* by means of threads strained across them, are not, perhaps, quite as practicable. Some surgeons object to the use of gutta-percha tissue, owing to its non-absorbent nature. It has done sufficiently well in my hands. Those who object to it might try very thin gauze, or, better still, some fine white gossamer, lubricated with a weak solution of carbolic acid in oil, with or without glycerine, placing over it a light pad of that useful material known as "absorbent" cotton wool, and carefully, but not too lightly, strapping and bandaging. (Mr. Chas. W. McCarthy, p. 225.)

Tropical Ringworm.—Tropical ringworm generally occurs upon the inner surface of the thighs and perineum, the scrotum and buttocks, and upon the pubes. Tropical ringworm or skin fungus is a most obstinate eruption to cure. Even if it is relieved in England, as soon as the patient returns to the tropics it is most likely to break out again, unless completely eradicated; at least this is my experience. Oleate of mercury (20 per cent.) is a valuable remedy, or liquor carbonis detergens painted over the affected parts is effectual. Hebra's sulphur and tar application is also good, and Goa powder is much used in India with stated good effects. I use carbolic oil with a few grains of red oxide of mercury with much success. (Mr. James Startin, p. 258.)

Varicose and Eczematous Ulcers.—"*Hazeline.*"—In chronic and intractable ulcers of the varicose or eczematous description, I have met with excellent results by using the new extract of *Hamamelis Virginica*, called Hazeline, after the fashion of a water-dressing. I may add that about two hundred cases of ulcerated legs pass through my wards annually. (Mr. W. H. Netherclift, British Med. Journal, June 18.)

WARTS.—*Chromic Acid.*—Chromic acid, one to one of water, is by far the best remedy. The skin round each wart is first protected by painting it with oil, and then the wart itself is soaked with the solution of chromic acid; this absorbs water from the tissues, coagulating and hardening the albuminous tissues at the same time, and the unsightly warts soon disappear. (Dr. W. A. Jamieson, p. 241.)

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## VENEREAL AFFECTIONS.

CHANCRE AND CHANCROID.—*Iodoform.*—Take iodoform 100 parts, sugar of milk 200 parts, thymol 1 part. Let the above be thoroughly mixed and reduced to an impalpable powder. The glans and prepuce must be thoroughly clean and dry. Then pack the ulcerated surfaces full of this powder, dust it over the surrounding parts, and secure it with a light bandage. Repeat the application as often as the parts become moist from new discharges. Ordinarily, about three applications will be required every day for the first two or three days, then as healing continues they may be repeated less frequently. A fair trial of this method I am certain will convince anyone of its superiority. (Dr. H. C. Howard, p. 265.)

*Pyrogallic Acid as an Application to Soft Chancres.*—MM. Lermoyez and Hitier write very favourably of pyrogallic acid in the treatment of soft chancres, and use the following formula: Pyrogallic acid and starch, of each 40 parts; vaseline, 120 parts; to be applied twice a day. This acts as a light and superficial caustic on the ulcerated surface, but does not harm the sound skin; it causes slight pain, which soon disappears. Under its influence soft chancres are said to heal up with marvellous rapidity. (Glasgow Medical Journal, Sept., p. 233.)

GONORRHŒA IN THE MALE.—A suppository (made in the same manner, and applied with the same instrument as directed at page lxxvii for uterine catarrh) may here be advantageously employed, care being taken to pass the suppository above the inflamed part. This treatment of gonorrhœa I have used for nearly two years, and I can testify to its great efficacy. It is a suitable substitute for injections, and is more sure in its effects. The application should always be made by the doctor, when possible. (Dr. H. C. Howard, p. 266.)

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## AFFECTIONS OF THE EYE AND EAR.

CATARACT.—*Advantages of Early Opening the Capsule.*—In the operation first proposed by Dr. Correnti, of Florence, the

cystitome (a curved cataract needle) is passed into the anterior chamber through the cornea before the section of the latter is made. At this stage the pupil, if previously dilated by atropine or any other mydriatic, remains widely open during the movements of the cystitome within its area, and a free laceration of the capsule can easily be effected, the point remaining visible to the operator all the time. There is this incidental advantage—the iris is less likely to be scratched or pricked by the needle than with a contracted pupil; and as it is floating in aqueous there is a certain space between it and the lens-capsule into which the point of the cystitome may pass, if necessary, without coming into contact with the iris. In performing this step of the operation it is important that the needle should pass obliquely through the corneal layers, and that its withdrawal should be slow, otherwise the aqueous escapes as the needle is withdrawn, and the subsequent steps of the operation are embarrassed. The needle I employ in this operation is more curved than that ordinarily used, and in order to allow of its point coming easily and directly into the pupillary area, I thrust it obliquely into the cornea from the temporal side at a point about half a line within its margin, and with the concavity of the needle towards the surface of the cornea. If I am in doubt as to the thickness of the cortical portion of the cataract, I at first make only a puncture in the centre of the capsule—the deeper it goes before meeting with resistance from the hard nucleus, the thicker is the cortex. In this way, and by the visible effects of the subsequent free laceration of the capsule, I can form a very fair estimate of the size of the nucleus, and its bulk relatively to that of the cortex—data very important as guides to the surgeon in regard to the extent of the corneal section. (Mr. W. Spencer Watson, p. 219.)

Chronic Suppuration of the Middle Ear.—*Iodoform.*—Scarcely anything in my experience of aural therapeutics has given me so much satisfaction as iodoform. The rapidity with which both fœtor and pus in very old-standing cases disappear under its use is truly astonishing. In the most inveterate cases I have seldom found it necessary to make the application oftener than twice a week. While I do not claim for it infallibility, or anything approaching such a position, I believe iodoform, properly applied, will lighten the labour and anxiety of those who undertake the treatment of tympanic suppurations more than anything else which has hitherto been advocated. Its objectionable odour may be very largely mitigated by trituration with a fourth part of tannic acid. (Dr. R. Sinclair, p. 222.)

GRANULATED LIDS.—Apply iodoform and sugar of milk, one part to five parts, directly to the everted lids with a soft brush. This occasions no smarting or pain, and often cures cases of months' standing in two or three weeks. Thymol should not be used in these cases, as it irritates and produces pain. (Dr. H. C. Howard, p. 265.)

HORDEOLUM, OR STYE.—One of the most active of the sulphur compounds, the sulphide of calcium, has been much praised by Ringer, in what may be called the furuncular diathesis, as hastening the maturation of those boils which have already appeared, and lessening the tendency to the formation of fresh ones. Bulkley has particularly insisted on its value in hordeolum or stye, several of which are so apt to form on the eyelids in succession. Sulphide of calcium is a very unstable salt, and it may well be that the sulphur set free from the calcium may in its nascent condition exert a special influence on the peri-glandular plexuses, and on the migration, fatty degeneration and death, of the exuded leucocytes. (Dr. W. A. Jamieson, p. 235.)

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## MIDWIFERY, ETC.

CHLORAL.—*Effects of in Lactation on Nurse or Nurseling.*—Chloral is now so frequently used in connection with parturition, and is such a well-known remedy for puerperal convulsions, that it is a most important medicine in connection with my subject. As regards its action Liebreich believes that the alkali of the blood decomposes hydrate of chloral, forming chloroform, and that the properties of chloral are due to the chloroform slowly formed in the blood. Dr. Amory concludes from his experiments that chloral hydrate does not decompose in the blood, and that its effects are consequently not due to chloroform. He could not detect chloroform in the blood and excreta (breath, &c.) of animals poisoned with chloral; this substance was easily detected in animals poisoned with chloroform, in the blood and excreta. Dr. Fothergill has pointed out the effects of chloral on the general vascular system, and its calming influence on the arterioles of the skin. We know that it is cumulative, and hence some of the sudden deaths from its use. So that if it be given as recommended by some accoucheurs it may affect the lacteal secretion. Ringer tells us E. Lambert recommends chloral in parturition in fifteen-grain doses every quarter of an hour till the patient falls asleep; and he states that this treatment does not weaken the uterine contractions, while the patient is prevented suffering pain, and is ensured calm repose after delivery. Dr. Playfair thinks that chloral acts far better than chloroform inhalation,

as chloral does not lessen the contraction, while it greatly lessens the pain. Moreover, it is chiefly applicable at a period when chloroform cannot be used, that is towards the termination of the first stage, before the complete dilatation of the os. The patient falls into a drowsy state, a sort of semi-sleep. Dr. Playfair gives fifteen grains, and repeats the dose in about twenty minutes, leaving its subsequent administration to circumstances. *Observation*:—Fifteen grains of chloral given to a patient every four hours before confinement, until seventy-five grains had been taken. Labour slow, tedious, terminated naturally. No trace on third day in milk. I believe that chloral does have an effect on milk, though when given before labour it is eliminated before the third day. The milk was distilled with caustic soda in a retort connected with a Liebig's condenser. Chloral giving chloroform by treatment with alkalies, the distillate was examined for that substance. The liquid was water free from milkiness, and had not the slightest odour or taste of chloroform. Chloral would therefore appear not to pass into the milk. It should however, be remarked, that the quantity of milk operated on was small, about 5 c.c. It is well to bear in mind that milk is sometimes present before labour, or the day after confinement, so that if large doses of chloral are given during labour in such cases, the child might suffer by being put to the breast. (Mr. Thomas M. Dolan, Practitioner, Sept., p. 161.)

Fissure of the Female Urethra.—This troublesome and intractable ailment yields promptly to the use of the same suppository which I have advised for uterine catarrh (*vide* p. lxxvii). Their use is commonly followed by the disappearance of those symptoms which are always associated with fissure of the urethra, and which so often lead to the false diagnosis of cystitis. (Dr. H. C. Howard, p. 266.)

Forceps.—*Mode of Using.*—1. Traction should be made in the intervals, instead of during the pains. 2. When traction is not being made, the handles of the forceps should be allowed to lie as far apart as they will. 3. During the pains the handles should be merely gently managed, so that they may not be expelled or do hurt. 4. During the passage of the head through the vulva, the forceps should be used, when necessary, as a restraining power during the pains, and labour completed by traction during an interval.—That traction should be made during an interval is most important, when we have to use the forceps before the cervix is completely dilated. If we make traction then, during a pain, the blades are tightly compressed between the head and the cervix, and practically, we are tugging at both the child and the womb.

Both the child's head itself, and the cervix itself, must, during the pain, be in a most favourable condition for receiving injury from the blades of the forceps. If regular pains do not exist, I should, as is generally recommended, wait a reasonable time between each act of traction. (Dr. H. Lowndes, p. 323.)

Inversion of the Uterus.—Numerous methods have been proposed for fixing the uterus and directing the force for reposition. The essentials of a good method are one that is safe, that gives proper support to the cervix and pelvic attachments of the uterus, and that tends to dilate the constricted part, viz., that portion of the uterine body abutting upon the inner os. The one hand of the operator in the vagina, pushing up the fundus, and the other hand steadying the cervix and endeavouring to dilate as far as possible the cup-shaped stricture formed by the base of the tumour, is perhaps the safest, if not also the most successful method. It needs perseverance and patience. An air pessary introduced into the vagina, and then dilated and left there, is a good preparation, and makes the vagina roomy, thus facilitating the manipulations of the hand which is pressing up. Cup-shaped repositors to aid in inversion are very numerous. The instrument I use is simply a straight rod of wood, the ends of which are expanded into two cups of different sizes. The larger is intended to aid in the inversion until the fundus is about as high as the inner os, and the smaller one is meant to complete the operation, as it can pass through the inner os. The necessity for using first a larger and then a smaller cup has been attempted to be obviated by having a movable bottom in the repositor, which at the same time is provided with an apparatus for exerting counter-extension. This repositor is applied so that the fundus uteri is received into the cup, whilst the other end is applied to the upper end of the uterus, and then the larger cup is made by suitable mechanical screw arrangements to push up the fundus as far as it can. After that object is effected, while it maintains its position, the movable bottom is propelled onwards to complete the reduction. The best method of operating is:—1st, To prepare the parts well with the air pessary, but not to continue that too long, on account of the danger of irritation it may set up, and the pain and distress it occasions. This may succeed alone—it has on many occasions. 2nd, But if this method fails, after having the patient well anæsthetized, efforts should be made, prolonged and steady, by manual pressure from the vagina and counter-pressure from the abdomen, to reduce the organ. The counter-pressure may

be made by an assistant, who may also endeavour to flatten out the cup by pressing on the outer sides of it. The reducing pressure, it appears to me, should be made on the fundus, after it has been well squeezed, so as to force out as much as possible of the blood it contains, to reduce its bulk as far as possible. These efforts are to be prolonged until the uterus is reduced or until the patient's condition compels us to desist. It is perfectly astonishing how little reaction usually follows such an operation. If the uterus stretches and the fundus is easily indented, the case may be looked upon as favourable. 3rd, A repositor may be used cautiously to complete the operation. It enables the operator to economize his force, as his hand cannot be applied advantageously in a mechanical point of view. But much care must be employed to avoid exerting too much force, and to make certain that the counter-pressure is perfect. Even under deep anæsthesia, counter-pressure is much more easily effected in some cases than in others.

*Amputation of the Uterus.*—In case of failure to replace inverted uterus, if the symptoms dependent upon the lesion are of a threatening character, the only means to secure permanent relief is amputation of the organ. This procedure doubtless mutilates the patient, and is in itself fraught with considerable risk. But we have to bear in mind that chronic inversion of the uterus, as a rule, gives rise to much annoyance, and it becomes a continual source of distress, whilst the accompanying hemorrhage may at any time jeopardize the patient's existence. In those cases, however, which give rise to only a moderate amount of bleeding and little inconvenience otherwise, it is not advisable to recommend amputation. Measures of a palliative nature should be employed, particularly rest at the periods, with ergot and astringent medicines, such as gallic acid. The leucorrhœa and uterine congestion are largely relieved by the hot douche. Iron in some form, as well as other tonics, are to be given between the periods. The results of amputation are not so unsatisfactory as is usually held, however. At one time it was deemed an operation that could not be undertaken on any consideration. The record of reported cases does not show so specially bad statistics. (Dr. Angus Macdonald, p. 267.)

Prolapsus of the Uterus.—*Radical Cure of.*—All authorities during the present century have recognised that of the vagina could be sufficiently narrowed, the cure of prolapsus uteri would be the result. Hence the late Dr. Hamilton tried to excite adhesive inflammation of the vaginal walls; and Cruveilheir applied caustics, escharotics and acids to the upper part of the vagina, so as to produce a cicatricial con-

traction of the tube, which would support the uterus. In a case operated on by Dr. Wallace, the patient being under ether, the cervix uteri was seized with a vulsellum, and the uterus and anterior vaginal wall put upon the stretch, a piece of mucous membrane was then dissected off the whole of the anterior surfaces of both, extending from close to os uteri to about half an inch from the urethra. The edges were brought together with wire sutures, and the prolapsed uterus reduced. The perineum, which was very defective, was then remedied thus:—The large duckbill speculum being introduced anteriorly, and the patient still fixed in the lithotomy position, with the buttocks well raised, an A-shaped piece of mucous membrane, extending upwards from rectal orifice nearly 3 inches, was dissected off the posterior vaginal wall, and the operation of perinæorrhaphy completed, the edges being brought together by transverse vaginal and perineal wire sutures. Patient recovered without a bad symptom. Sutures removed in a fortnight, and she was discharged cured, the uterus being well kept in position. (Dr. J. Wallace, p. 278.)

Sickness of Pregnancy.—*Belladonna.*—Belladonna in very small doses, as two minims of the tincture, frequently repeated, is an excellent remedy in many cases of sickness of pregnancy. (Dr. W. M. Campbell, British Medical Journal, June 4.)

Uterine Catarrh.—For uterine catarrh, in which there is congestion, and a consequent discharge, with some enlargement, and an erosion extending up into the canal, I employ a suppository, which is made and applied in the following manner: Mix one half dram of finely-powdered iodoform with one ounce of the butter of cocoa. This may be kept in a shallow ointment-jar. I have a thin silver tube about one-fifth inch in diameter, with a closely-fitting piston. This tube is about eight inches long. When a suppository is needed I retract the plunger or piston to a point from the distal extremity of the tube corresponding to the length of the required suppository. Then fill the lower end of the tube by plunging it again and again forcibly into the jar containing the material for the suppository, and packing it solid by downward pressure of the piston. Then I apply the suppository by passing the end of the tube into the cervical canal, and force it out by pushing in the piston. The suppository will then be in the desired place. Five grams of the iodoform may be used at a time. Unlike the gelatine pencils of iodoform, which are so widely advertised, this melts and takes effect at once, and causes no pain. (Dr. H. C. Howard, p. 266.)

Uterine Displacements.—*Improved Method of Treating.*—Before being led to employ the present application I used more or less, for years previously, the ordinary glycerine of tannin of the pharmacopœia; but though I found it a most efficacious astringent, and answered the purpose I had in view most admirably, yet its expense was a decided barrier to its universal employment, and moreover, it had the disadvantage of staining the underclothing so much that this of itself told very much against it ever being adopted as a popular remedy. I therefore had recourse to the following solution: Glycerine, 80 oz; alum, 10 oz; carbolic acid, $1\frac{1}{4}$oz. It is well known to gynecologists that glycerine applied on cotton tampons has a most beneficial effect in stimulating the capillary circulation of the uterus and pelvis; moreover, that it acts as a depleting agent, insomuch that it drains the blood of a certain portion of its watery constituents by virtue of its great affinity for water. In short, if there is hypertrophy of the organ or of the cervix alone, we have in glycerine tampons a great aid to the treatment of such cases. The presence of this tampon excites an abundant water discharge from the vagina, necessitating the patient constantly to wear a napkin. Glycerine, as has just been observed, excites this discharge, but when combined with an astringent, the effect is an even more profuse drainage of the watery components of the blood; moreover, the effect on the capillary circulation is also intensified, and the astringent effect on the vaginal walls is most beneficial. By this means alone I have had the satisfaction of seeing patients completely cured of procidentia which had existed from three to eight years, after persevering in the above treatment for a period varying from two to seven months; and in a few cases where the disease has existed for a much greater length of time very great relief has been experienced after a more protracted course of treatment. If the tampon is merely saturated with glycerine it becomes very offensive after a few hours, and if with glycerine and alum alone, although it does not become fœtid so soon, yet it will do so much too rapidly to enable us to get the full beneficial effect. When, however, the carbolic acid is added, it will be found that there is no fœtor at the end of four days, when the tampon may be removed, to be replaced by another. By this means we can keep the organ *in situ* for weeks and months together, and likewise act on it and the neighbouring tissues with such an advantageous result as to restore them to a healthy condition, while we also have the satisfaction of seeing the woman's general condition indicating a marked improvement, which certainly very much increases the probability of the benefit derived from the local treatment being permanent.

I claim for this method of treatment equal advantages with any plastic operation that may be performed upon the vaginal walls; and there is this to boot, that the uterus itself also probably partakes of benefits which an operation on the vaginal walls cannot confer. (Dr. Robert Bell, p. 288.)

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## MISCELLANEA.

ANÆSTHESIA.—*A Hint to Chloroformists.*—When in Paris I was invited by Dr. Labbé to assist in a case of ovariotomy. The patient was given chloroform. When the anæsthesia was complete, the surgeon made his incision in the linea alba, through the skin and cellular tissue. Suddenly the respiration stopped, and the heart ceased to beat, as clearly shown by the cessation of bleeding and the bloodless appearance of the lips of the wound. The mouth was cleansed from mucus, the tongue drawn forwards, the patient's head thrown well back, and artificial respiration was practised for quite ten minutes, but without result. The case appeared desperate, when Dr. Labbé put a large cloth in boiling water and applied it to the cardiac region. Instantly the heart commenced to beat and the patient to respire. She was saved. The operation was not terminated. The cloth was of such a heat that a large blister was raised at the seat of its application. Such simple and ever at hand means, has succeeded several times with Dr. Labbé. (Dr. Adofo Paggi, Lancet, June 18.)

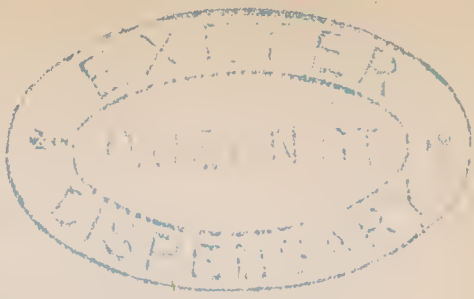
BROMIDES IN RELATION TO TRAVELLING.—Dr. Tilt recommends the use of bromide of potassium to persons who have spent a long day in travelling. He orders twenty-five to thirty grains of the drug to be taken in a wineglassful of cold water before going to bed. In this way weak and nervous women may readily be enabled to travel all night without injury, especially if the same quantity of bromide is given them before starting as well as upon reaching their destination next morning. The first dose generally brings on the usual tranquil sleep, or, at all events, calms the system, and abates the irksome uneasiness of body and soul that follows long travelling in a cramped position. Bromides may be thus ordered for two or three successive days at a week's interval, during a two months' tour, warning the patient against taking large doses, and against taking the drug day after day during the whole course of travelling without further medical advice. It is easy to have the roughly powdered bromide made up in powders of twenty-five grains,

and one or two dozen of these powders can be stowed away with a box of aperient pills, three or four ounces of bicarbonate of soda, a small pot of vaselin, and a roll of papier Fayard, to supplement the loss of epidermis from the feet or any other part of the body. (Dr. E. J. Tilt, British Medical Journal, July 2.)

Gutta-percha Apparatus and Instruments.—From a surgical point of view gutta-percha presents the inconvenience of yielding brittle apparatuses, and, in warm climates, it becomes so brittle after a few months that surgeons are unable to use it. M. Fleury finds that by making a mixture of 9 parts gutta-percha with 1 part camphor a product is obtained which is very soft and coheres perfectly at a temperature of 58° C. When cool it remains coherent and elastic. (Répert. de Pharm.)

Improved Styptic Colloid.—Collodion, 100 parts; carbolic acid, 10 parts; tannin, 5 parts; benzoic acid (from the gum), 5 parts. Mix in the above order, and perfect solution is effected. This preparation is of a brown colour, and leaves on evaporation a strongly adherent pellicle. It instantly coagulates blood, forming a consistent clot, and a wound rapidly cicatrises under its protection. (Louisville Medical News.)

Improved Diachylon Ointment.—Prof. Duhring (Phil. Med. Times, May 7), after observing on the little success that has attended the attempts to prepare this ointment in a satisfactory manner, states that a pharmacist of Philadelphia has succeeded in preparing it of a uniformly superior quality after long experimenting—the ointment prepared from Hebra's directions not having answered expectations. The following formula furnishes an ointment containing a definite amount of oxide of lead, which with the use of litharge cannot be estimated :—One part of freshly precipitated (from acetate of lead) pure white hydro-oxide of lead is rubbed into two parts of water, and mixed well with six parts of the best Lucca olive oil. It should be stirred for about two hours over a hot-water bath near to boiling-point, and cooled with constant stirring until the proper consistence is obtained. While cooling, a drachm of oil of lavender to the half-pound of ointment is added. This ointment contains the oleo-stearate of lead, has a neutral reaction, and can be kept in good condition for some time. It is a smooth, whitish, elegant preparation, and is altogether more desirable than that made from any other formula. (Med. Times and Gazette, June 25.)



# PRACTICAL MEDICINE.

## DISEASES AFFECTING THE SYSTEM GENERALLY.

### ART. 1.—ON THE RELATION OF MINUTE ORGANISMS TO DISEASE PROCESSES.

By JOSEPH COATS, M.D., Editor of the Glasgow Medical Journal.

Most of our readers have already, in the weekly medical journals, seen pretty full accounts of the more important matters discussed at the Congress lately held in London. No mere account of these discussions can give an adequate idea of the impression made on an actual witness of this vast gathering of medical men, a gathering such as the world has never seen before. There were present above 3,000 qualified medical men from all parts of the civilised world, and the appearance of them in the crowded opening meeting or at the conversaziones, was a sight to be remembered.

Among the more purely scientific subjects under discussion, none was regarded with more interest than that of the relation of minute organisms to disease processes. The address of Pasteur, in which he describes his method of obtaining a vaccine for chicken cholera and anthrax, will have been perused with great interest by our readers, and we observe that the President of the Local Government Board has promised to issue it as a parliamentary paper. On all hands it was acknowledged that there is a connection between specific diseases and micro-organisms, but among the best observers a note of warning was sounded against carrying inferences too far. Lister reminded his hearers that inflammations are not always the result of the action of these organisms, and that the nervous system has an important function in this regard. Then, in regard to experiments in which the organisms have been cultivated outside the body, Pasteur, who himself has great experience in this method, was peculiarly emphatic in insisting on the frequent sources of error in such cultivation-experiments. Some authors have recently been making out that certain forms of bacilli and micrococci are, to some extent, interchangeable. Buchner, for instance, as Virchow in an amusing speech pointed out, believes that the well-known bacillus anthracis may, by cultivation in vegetable infusions, be developed into an innocent micrococcus, and may be re-transformed into the savage form by being inoculated on an animal fluid. There are even some, and notably

Hueter and Fokker, who believe in the essential unity of the various minute organisms. Pasteur very properly insisted on the possible fallacy of all such deductions, and boldly characterised many of the inferences as "pure illusions."

In this regard the demonstrations of Koch were peculiarly instructive. If any of our readers have not yet perused Koch's work, recently translated by the Sydenham Society, we should advise them to do so forthwith. At the Congress Koch showed, by magic lantern, micro-photographs of the blood and tissues in various diseases, illustrative of the part played by these organisms. He contented himself with describing what was to be seen, and showed, as indeed his book manifests, a truly scientific absence of the desire to push facts in support of theory.

Koch also gave a private demonstration of some of his cultivation-experiments, at which we were present, and as they seem to us of peculiar force and simplicity, we propose to give a brief account of them here. This account is written from memory, and does not purport to give a full or minutely accurate description of the things seen. The object in these experiments is to obtain the micro-organisms in a pure state, that is, separate from each other, and to cultivate them in some medium in which they will grow.

It is exceedingly difficult to obtain pure cultivations of these micro-organisms in fluids, because, if a fluid be used, any accidental contamination almost immediately spreads through the whole fluid, and the entire experiment is vitiated. For instance, it was pointed out by Pasteur, in speaking of the supposed conversion of one form into another, that supposing you have one form growing vigorously in one fluid medium, and from this you inoculate another, you may in so doing inoculate an organism which in the first medium was so subordinate as to escape notice. In the second medium the forms, as it were, change places: that which was vigorous becomes subordinate, and that which was subordinate becomes vigorous, and so there is an apparent conversion of the one into the other. But this apparent conversion is "pure illusion." Experiments with a solid medium, however, are hardly exposed to this source of fallacy. Any accidental contamination will occur at one or more fixed points, and the organism will develop from these points outwards, showing its presence by the changes it produces. In this way the experiment is only partially vitiated, and a further *pure* inoculation can at once be effected by avoiding the contaminated spot.

Koch has been using potatoes as a soil for the cultivation of organisms. He boils them sufficiently and then halves them, the cut surface being the soil on which the plants are to be grown. Of course it is only some organisms that will grow on this soil,

but the number is not very limited; not less than a hundred have been actually cultivated in this way. Dr. Koch showed many potatoes which had been planted during the previous few days, and nothing could be more striking than the demonstration. A considerable area of the cut surface was seen to be occupied by a variously coloured substance which showed evidence, in the character of its outline, that it was extending. The naked eye appearance of each individual form was perfectly distinct, one a bright crimson, one yellow, one blueish, one dead white, one brownish white. The general appearance of each was characteristic, and one had no difficulty in saying that these were separate organisms. One, for instance, secretes a sort of mucus which could be drawn into long strings. Now these are not fungi. If a fungus grows it can be distinguished. It has much more of an aërial growth, while these are nearly all confined to the substance of the soil. Under the microscope they are found to be determinate micrococci and bacilli. That is to say, adopting Cohn's classification, there were some in the form of globular particles uniform in size, these being the micrococci, and some in the form of rods, the bacilli. In some the rods were very short, and it was sometimes difficult to decide whether the organism was a bacillus or a micrococcus. These organisms presented great divergences under the microscope, but not greater than in their general naked eye manifestations on the exposed surface of the potato. On the potato the bacillus anthracis of splenic fever can be cultivated, and Dr. Koch showed us two half potatoes on which this had been done. A greyish area represented to the naked eye this bacillus. He was careful to leave these exposed as short as possible, as a fly walking over the surface might carry off bacilli and inoculate one of the spectators with anthrax.

These experiments are profoundly simple. The potatoes are kept on a plate covered by a bell jar, inside which there are pieces of wet blotting paper to keep the air moist. The potatoes are first boiled and sliced. Then with a knife, which has been recently heated in the flame of a Bunsen's burner, a little of the organism is taken and spread on the surface. Under the bell jar the potatoes are protected from flies and from further contamination.

In order to obtain some of these organisms for cultivation it is only necessary to expose the surface of the potato for a few hours in the air, and in a day or two there will be quite a garden of various plants. Each plant, however, has its special centre, and though they may overlap, yet if taken sufficiently early, it is easy to inoculate other potatoes with the individual forms and so obtain pure cultivations. There is one form which is of very frequent occurrence, and, indeed, is sometimes difficult to

get rid of. It or its germs are usually present in the earth around the potato, and are apt to escape destruction in boiling because buried in a little bit of earth. It not infrequently, therefore, grows in from the edge and so contaminates the experiment. But this contamination is limited and its extent can be directly recognised, as the naked eye appearance of the organism is perfectly distinct. This form is called by Koch the potato bacillus.

It has been mentioned that the anthrax bacillus can be cultivated on potatoes, but this is not the case with most pathogenic micro-organisms. They mostly require a different soil, and hitherto they have usually been cultivated in fluids. By a method which is simplicity itself Koch has succeeded in cultivating these in such a way as to afford the full advantages of a solid soil, and yet give these organisms the proper medium for their development. He takes the various media, hay infusion, beef-juice, blood serum, &c., and adds $2\frac{1}{2}$ to 3 per cent. gelatine. He boils or melts them together, and, on cooling, he gets a solid medium. The gelatine does not in the least interfere with the development of the organisms. In the case of blood serum it will not do to boil the solution, as the albumen will coagulate; but it may be heated to 60° C. and allowed to stand. If no organisms develop in a day or two, then it may be regarded as sterile. If they do it may be heated again. If such a medium be accidentally contaminated, then the growth will occur visibly in its substance, and if a test tube, for instance, be the vessel used to hold the medium, it can be readily seen. If any inoculation be made it will naturally be at the surface, and the two will thus be separately distinguishable. The gelatine medium may be in a test tube, or in a shallow vessel, or in the form of an elongated drop on a microscopic slide, in the latter form being suitable for examination, with a low power, under the microscope. In this way Koch has succeeded in cultivating several pathogenic organisms. The anthrax bacillus was shown in this medium. In regard to this bacillus, Koch showed a number of little pieces of white thread which had been impregnated with the spores of this organism ten years ago, and they are at this moment as active as ever. While the bacillus itself is readily destroyed, the spores show a remarkable resistance to destructive agents. Carbolic acid has very little effect on them; it is only after prolonged exposure to a watery solution that they lose their vitality, and they are not affected at all by an oily solution. They also resist a much higher temperature than most organisms. In this way, also, were cultivated the bacillus of septicæmia of the mouse, and the virulent infective bacillus. This bacillus is exceedingly virulent, so that a drop of water containing blood diluted a

million times is sufficient to kill an animal in a short time. This bacillus is probably that which occurred in the experiments of Davaine, as its form is like that described by him. These various bacilli have a characteristic mode of growth, and they retain their powers when cultivated through a long series of generations.

This gelatine soil is also used for a rough method of making a quantitative estimate of the existence of these organisms in air, water, and earth. In order to test the air, Koch put some of the gelatine material in a shallow glass, and exposed it for four hours to the air of London outside the laboratory. He showed the result. The surface was dotted over with a large number of spots of various colour and appearance. In this way perhaps 40 or 50 different organisms were deposited. In the laboratory itself their number was much less. Each of these organisms developed from a distinct centre and could be used for inoculation, so as to obtain a pure cultivation. In analyzing water, a certain amount of water from the tap was mixed with the gelatine material, with slight heat, so as to melt the latter. It could be seen that in the midst of the gelatine there were distinct centres of development, while in one the development had gone so far as to break up and fluidify the material. In the case of earth a few grains were strewn on the gelatine on a glass slide, and each grain was seen to be the centre of a distinct development. Of course, in all these experiments care was taken to prevent drying in of the medium, and, as much as possible, the contamination with other organisms, although such contamination, as already explained, is in this method of much less serious import than with other methods. The cultivation of the organism which gives its colour to green pus, and that which makes milk blue, was of some interest. He showed us on potatoes and gelatine the appearance of these organisms, and in the case of the green pus, demonstrated that the colour becomes more distinct on exposure to the air, and, more quickly, on exposure to the vapour of ammonia.

The effects of these organisms introduced into animals by inoculation was referred to. The septicæmia of mice and the malignant infective disease was described, and the bacilli afterwards demonstrated under the microscope. If the bacillus of septicæmia, even when cultivated through several generations in the gelatine medium be inoculated into a mouse, it is fatal in less than 48 hours, and the organism is found abundantly in the blood. Some of the blood of a mouse which had died of this disease, prepared by Koch's method was afterwards demonstrated under the microscope. It is remarkable that this bacillus, while it produces a general disease in mice and is cer-

tainly fatal in a day or two, produces in rabbits a local disease and is not fatal. If in the rabbit the same bacillus be inoculated into an ear, the result is an intense inflammation of the ear, like erysipelas, while the animal is feverish. The animal, however, recovers, and it is noteworthy that it is no longer capable of infection with this bacillus. The one attack produces an immunity just as an attack of small-pox does, although the organism appears to remain local. This is the only organism so far as Koch has gone, which he has found to confer such immunity.

The method of preparing blood for demonstration may here be briefly described. With a knife and forceps which have been recently superheated, a dissection is made in such a way as to reach the desired point. With a cover glass (also recently heated) a little blood is obtained and smeared in a thin layer on another cover glass. If the blood, immediately after drying, be treated with a watery solution of an aniline dye, the albumen will dissolve and be afterwards deposited in granules so as to confuse the appearances. If it be left a few days there is less solution of albumen. Absolute alcohol is better still. But the result is effected in a few minutes, if the cover glass be placed in a hot chamber and exposed to a temperature of 120-150° C. A too prolonged exposure destroys the organisms. The smear of blood being treated in this way, the next process is the colouring of the organisms. Any aniline dye may be used, but Koch has found most convenient a pigment called Methylenblau (methyl blue). This pigment in a watery solution acts rapidly, but, on a prolonged exposure, the colour does not become too deep. After waiting a few minutes the superabundant solution is run off and the cover glass placed on a slide. A stream of water is allowed to run under the cover glass and sucked up by blotting paper at the other end, so as to remove any excess of colouring matter. The blood may now be immediately demonstrated, or after drying may be mounted in Canada balsam as usual.

These demonstrations of Koch's seem to us of the utmost importance, especially as following out what may be called the natural history of minute organisms. A drop of decomposing animal fluid teems with organisms, and it is most difficult to say whether there are one or many kinds present. But here it is definitely shown that there are innumerable species of micrococci and bacilli which are distinguishable not only by their minute character under the microscope, which are sometimes rather difficult to make out, but by their general characters when developed in mass, as visible to the naked eye. It is an important step to prove that there are specific differences among these organisms. It is an equally important step to have

separated them and traced the individual effects of some of them on living animals.—*Glas. Med. Jour.*, *Sep.* 1881, *p.* 185.

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## 2.—ON THE GERM THEORY OF DISEASE.—PATHOLOGICAL ACTION OF GERMS IN THE ANIMAL ECONOMY.

By Dr. George Harley, F.R.S., London.

Those who have taken sufficient interest in the germ theory of disease to read all that has been recently written upon the subject must be perfectly conscious that it has already not only adduced facts which have given an entirely new complexion to our ideas regarding the etiology of epidemics of both temperate and tropical zones, but even of the pathology of boils, abscesses, erysipelas, gonorrhœa, and chancre. So that it may safely be prophesied that as our knowledge of the life-history of epizootic and miasmatic poison germs becomes more extended our ideas of the nature of all diseases, without exception, will materially change. This I am sanguine enough to believe must of necessity be the case, for even within the last five years a clue has been apparently found in the writings of Pasteur, Lister, Billroth, Ewart, Buchner, Watson, Cheyne, Ogston, Koch, Wolff, Klebs, Neisser, Obermeier, Recklinghausen, Bastian, Tyndall, Rindfleisch, Stromeyer, Letzerich, Birch-Hirschfeld, Waldeyer, Carter, Bell, Ballard, Greenfield, Sanderson, Taylor, Reiss, Coze, Feltz, Frisch, Vogt, and Israel, to some of what have heretofore been considered the most obscure parts in the history of contagious and infectious diseases. These writers have in different ways shown, from direct observations made on the human subject, how typhoid fever can be distributed by contaminated water; how scarlet fever can be propagated by the milkman's can; how woolsorters' disease can be communicated from a sack of horsehair, brought all the way, it may be, from the steppes of Russia. Nay, more, Obermeier has shown that a germ named "spirilum" is invariably present in the blood of patients suffering from relapsing fever (*Centralblt. Med. Wissensch.*, 1873, p. 145). Manson has shown that elephantiasis is due to the presence of a filaria in the bloodvessels. Lewis and Bancroft have stated that chyluria and lymph-scrotum depend on the existence of the same parasite in the lymphatics, and it has been long known that the eating of bread made of spurred rye (a disease of the plant produced by a fungus) gives rise to fever and local inflammations ending in mortification of the parts so affected, be they the toes, the fingers, or the point of the nose.

It has equally for at least more than a quarter of a century been known that a chronic form of gastritis, accompanied by frothy vomiting, is entirely due to the presence of a microscopic oganism called the sarcina ventriculi, which exerts its patho-

logical powers by producing violent fermentation in the contents of the stomach, in which it multiplies to a sufficient extent to give to the ejected matters a green appearance. One of the most careful experimenters of the present day again—Mons. Pasteur—has clearly shown that he can give anthrax, Siberian cattle-plague, to sheep by watering their food with disease germs. He has also equally clearly demonstrated that "chicken cholera" can be propagated by inoculating fowls with bacteroid disease germs. Again, the experiments of Dr. Vandyke Carter on the artificial introduction of the spirilum parasite into the subcutaneous tissues of animals, monkeys, &c., show that not only are marked febrile symptoms—after a period of incubation—the result; but anatomical lesions in some respects resembling those met with in contagious jaundice—namely, "congestion of the mucous membrane of the stomach with minute petechiæ about the middle of the viscus, while both the liver and the spleen are congested." (Medical and Chirurgical Society's Transactions, vol. lxiii., p. 140.) Here from spirilli we have not only, as Dr. Carter remarks, a congested liver, but blood extravasation, exactly analogous to what occurs in the preliminary stage of the black vomit and tarry ejections, not alone met with in contagious jaundice, but in acute atrophy of the liver, as well as in the malarial jaundice of the tropics; while splenic fever has equally been shown, by experiments on animals, to be the product of a germ called bacillus anthracis. Talamon says (in a communication he made to the Société Anatomique de Paris, 1880-1) that by inoculating a specific bacillic form of organism into the mucous membrane of the mouth of animals (rabbits, guinea-pigs, &c.) he obtained the formation of a false membrane, and an œdematous condition of the submucous connective tissue exactly analogous to what occurs in diphtheria in the human being, and that the false membrane thus artificially produced contained similar bacillar organisms to what occur in true diphtheria. Added to this the following paragraph in the British Medical Journal of Nov. 6th, 1880, also tends to throw light on the etiology of malarial as well as of contagious jaundice.

"Dr. Lauchlan Aitken of Rome writes to us:—'The proof of the existence of a specific malarial germ has just received important confirmation. At the Italian Medical Congress held in September at Genoa, Dr. Marchiafava, assistant to the Professor of Pathological Anatomy at Rome, announced that he had found the bacillus malariæ in the blood of three patients during the cold stage of the malarial fever from which they suffered. Since that time twenty-four cases have been examined, with the result, in every instance, of showing the presence of the bacillus in the blood during the period of in-

vasion, while the spores alone could be seen when the fever was at its height. The same careful observer, as long ago as last autumn, had found the rods and spores of the bacillus in the lymph, blood, spleen, and medullary cavities of bones at the post-mortem examinations of three persons who had died from pernicious fever, but no one had hitherto succeeded in demonstrating the presence of the bacillus in the blood of living patients, owing to the specimens examined having been always taken during the hot stage of the fever. Professor Perroncito of Turin (one of the leading mycologists of Italy) has repeated Dr. Marchiafava's observations in the Hospital of Vercelli, in Piedmont, which annually receives about four thousand cases of malarial fever, though not of a pernicious type, from the surrounding district, which is covered with ricefields. The result is that he, too, has found the bacillus, occasionally in large quantity, in the blood, during the cold stage of all the cases examined, and sometimes also in the last hours of the intermittent period. I saw, to-day, at the Santo Spirito Hospital, a specimen of blood within five minutes from the time when it had been taken, with all due precautions, from a patient just entering on the cold stage, which contained two or three bacilli in all respects identical with those exhibited at Cambridge, got, it may be recollected, by the cultivation of some mud from near Selinunte, a very malarial port in Sicily. Observations are now to be made, both at Rome and Vercelli, according to a common programme drawn up by Professor Tommasi Crudeli, of the blood of the spleen, drawn off by aspiration through a hypodermic syringe during the last hours of the intermittent period, and also of the perspiration and urine during the stage of resolution. Professor Tommasi Crudeli hopes that British practitioners who have many opportunities, both in India and the Colonies, will make similar researches, but cautions them that a good illumination is essential, and that it is useless to work with less than a one-eighth-inch object-glass.' "

With these preliminary remarks I shall now proceed to give a brief summary of my views regarding this still imperfectly understood question. In 1858-9, when the germ theory was beginning to occupy the attention of pathologists, and it was said that diphtheria was due to the fungus called oidium albicans, growing in and upon the mucous membrane of the fauces, it occurred to me to test the matter experimentally (see the Lancet for Jan. and Feb. 1859) and while doing so I was led to make a series of physiological experiments with the express view of ascertaining the following points :—

(*a*) If healthy vegetable microscopic fungi and their spores when introduced directly into the circulation of healthy living animals produce deleterious pathological results.

(*b*) If they do, to try to ascertain whether or no their pathological results were due to the mere mechanical presence of the fungi and their spores in the tissues and circulation, or to their possessing a special toxic action upon the animal system—acting, in fact, like true poisons; a poison being, as I define it, a substance which in minute quantity possesses the power of producing artificial disease, either alone, or artificial disease and death, by its action upon the nerves and other tissues of an otherwise healthy animal; poisons being either mineral, vegetable, or animal, and acting in one of two ways, either as dead chemical substances or as living organisms—so-called germ-parasites—which produce artificial disease in, and the death of, the animal they infest by virtue of their development and multiplication in its bloodvessels, lymphatics, and tissues.

(*c*) If, again, it were ascertained that living germs produce disease and death by specific toxic action, apparently in the same way as dead poisons do, to try to discover whether or no each individual species of germ possessed a deleterious specific something proper to its own organisation, or had merely accidentally acquired poisonous properties from the soil in which it grew, and the materials upon which it chanced to have fed.

(*d*) If the severity of the pathological results following upon the introduction of living animal and vegetable organisms is in proportion to the abnormality of their source more than to their organisation.

(*e*) If animal germs are as deleterious to animal life as vegetable ones are.

(*f*) If the introduction of germ-spawn would be sufficient to induce the same chain of pathological results as the introduction into the body of mature germs themselves.

(*g*) If physiological animal poisons, such as snake venom, act in the same way as pathological animal germs do.

These being the questions I set before myself for solution, and being already aware, from results I had previously obtained from the injection of putrid fluids, such as blood and milk, into the circulation of healthy animals, that the deleterious effects of decomposing animal matter are like those produced by mineral poisons as materially influenced by quantity as by quality, before attempting to draw any conclusions, I determined to regulate as correctly as possible the quantity of materials employed in each experiment, as well as the extent of surface with which they were brought in contact. This was all the more necessary for me to do from my entertaining the belief that all the manifestations of healthy animal and vegetable life observable by us are, as I said in the debate which followed the reading of Dr. Marcet's paper on Respiration at High Altitudes, at the Royal Society in February 1881, nothing else than the

chemico-physical results of the active progressive oxygenation of organic compounds; while I am further of opinion that all the varying forms of decomposition and putrefaction of animal and vegetable matter, though the result of a retrograde process of oxygenation of organic matter, is accompanied by, and indispensably connected with, the development and multiplication of living organic and organised germs.

Moreover, believing as I do that there are both animal and vegetable disease micro-organisms—collectively named germs,—and perhaps even a third species occupying the debatable land between the animal and vegetable kingdoms, all of which live and breathe just as big animals and plants do, I selected for my experiments the following materials:—

*a*. Vegetable ferment germs, from German yeast. *b*. Vegetable fungi and fungi spores, from the surface of decomposing wheaten flour paste. *c*. Vegetable oidium albicans, from decomposing healthy gastric juice. *d*. Vegetable fungi and spores of fungi cultivated in an aqueous solution of decomposing muscle. *e*. Vegetable green fungi and spores of fungi grown on the scum of putrefying snake's intestines. *f*. Animal ferment germs, Brownian granules, vibriones, &c., from putrid normal gastric juice. *g*. Animal ferment germs, Brownian granules, vibriones, &c., from macerating diseased bones. *h*. Animal heterogeneous micro-organisms, from foul-smelling dissecting-room macerating-trough. *i*. Animal germ-spawn, obtained separated from mature organisms by filtration through thick white filter-paper. *j*, and lastly. Physiological animal poisons from cobras and puff-adders.

The experiments were conducted in the following wise, and, in order to enhance the comparative value of their results as near as possible, under precisely the same conditions. The animals used were adult healthy dogs and rats, and always operated upon at the same period of digestion. The materials employed were always suspended in distilled water, and slowly injected into either the jugular or femoral veins, or under the skin of the animal's back. The fungi taken from putrid solutions were carefully washed with distilled water on a filter before being used. Some trifling variations made in the mode of experimenting will be specially alluded to in each report of the special experiment.

The order in which the experiments were conducted—both as regards the vegetable and animal micro-organisms—was first to take the normal, then the abnormal, beginning with those supposed to be the most benign, ending with what was regarded as the most virulent.

Every experiment was repeated twice, and if the results obtained were not in both cases identical, it was repeated until I

was satisfied that the result was trustworthy. I shall now give examples of each experiment, the results of which, if carefully read, speak for themselves.

*Effects of Vegetable Germs Artificially introduced into the Bodies of Healthy Animals.*—(*a*) Mixed with an ounce of distilled water a quantity of friable German yeast paste, Saccharomyces cerevisiæ, which, under the microscope, showed large spores of an average diameter of $\frac{1}{400}$ m.m., besides numerous Brownian granules in active movement, together with a few elongated cells, partly with granular contents, partly with one, two, and sometimes three distinct nuclei in them. Many of the spherical spores possessed also one and sometimes two nuclei. After brisk agitation, on standing for a minute or two, the distilled water still retained in suspension enough of the yeast to give to it an opalescent milky appearance. This mixture was then slowly injected into the left jugular vein of a healthy dog. The result was absolutely *nil*. For neither immediately after the injection nor for seven days subsequently did the animal manifest one single pathological sign or symptom. As the animal refused to die or become ill on the eighth day it was killed, and a careful post-mortem examination made.

The tissues when examined after death all appeared healthy. Its blood ran into beautiful normal rolls, and looked in every respect perfectly normal. Not a fungus filament nor a fungus spore was to be seen in it, which proved that they had been destroyed in, and eliminated from, the circulation. But what destroyed them, or whether their elimination took place by the kidneys, lungs, or skin, there was no evidence to show.

(*b*) The next point was to ascertain if other kinds of fungi and fungi spores were equally harmless as yeast ferment when introduced into the circulation of a healthy animal; and with the view of ascertaining this point the following experiment was made. A quantity of the green flowering fungus which grows so luxuriantly on old wheaten flour paste was collected, and well washed with distilled water; after which as much of it was added to a fresh quantity of distilled water as it could suspend for a few minutes, after brisk agitation with a glass rod, and an ounce of the mixture slowly injected into the right femoral vein of a healthy, full-sized English terrier dog. No immediate effects were observed; but on the following morning it looked drowsy and listless. This effect soon, however, passed of, for it was to all appearance, perfectly well the next morning, and so remained.

(*c*) Being satisfied that these kinds of microscopic fungi, grown in decomposing vegetable soil, produced no deleterious effects on healthy animals, I proceeded a step further, and tried to ascertain if the same kinds of fungi grown in decomposing animal soil were equally inocuous to animal life.

A quantity of oidium albicans, which I had artificially reared in normal gastric juice, obtained from a dog's stomach through a fistulous opening, after being washed was added to, and suspended in distilled water in the manner already described; but as it was rather lumpy it was strained through a muslin cloth before being injected, and to make sure that both filaments and spores went through the cloth, a drop of it was examined under the microscope. Finding that the strained water was loaded both with spores and filaments, an ounce of it was slowly injected into the jugular vein of a healthy, nearly full-grown, mongrel pointer dog. It produced no immediate effect, but on the following day the animal seemed out of sorts. It began to get better on the next, and three days after the injection was made it had perfectly recovered.

Having now, as I thought, learned sufficient of the effects of injecting into the circulation of healthy animals what might be called non-deleterious vegetable fungi and fungi spores, it was deemed advisable to advance at once a step further, from the simple to the complex, and consequently I

(*d*) proceeded to inject into the right femoral vein of a healthy dog the same quantity (as near as could be guessed) of the filaments and spores of an oidium albicans fungus, after having well washed it with distilled water, artificially cultivated in a putrid solution of human diseased muscle. Next day the animal appeared out of sorts, and continued so for several days, but by the end of a fortnight it was perfectly well. Here be it observed more decided toxic effects were produced than in the preceding case. This I believe was due to the fungus employed having been grown in a more deleterious kind of putrid animal fluid, and its probably having imbibed some of the liquid's putrescent ingredients. On pushing this mode of experimenting a stage further, the following still more marked toxic symptoms were obtained:

(*e*) I took a quantity of microscopic green fungi in full bloom from the scum on the surface of water in a dish containing the putrefying intestines of a cobra (the animal that killed his keeper at the Zoological Gardens), and to make sure, as far as was possible, that none of the animal germs in the scum were left adhering to the external surface of the fungi, washed them in seven different quantities of pure distilled water; then added them to a fresh quantity of distilled water, which on brisk agitation became of quite a green colour, and a puff-ball-like odour. An ounce of this saturated water was now injected into the right jugular vein of the same terrier dog as was employed in experiment (*b*), which appeared to be in buoyant health. This was done on a Saturday, and when the dog's kennel was next visited on Monday morning, which was

not for forty-four hours, it was found not only dead, but quite stiff, with rigor mortis, and its tongue hanging out of its mouth. The left side of the heart was contracted upon a small, but not firm blood-clot, in which there was no separation of red from white coagulum visible. The thoracic organs appeared to be more than usually full of blood, and the thymus gland was decidedly congested. The trachea and the epiglotis also had their vessels congested, and in half a dozen different places there were small mustard-seed-sized extravasations of blood in their mucous membranes. In the duodenum, again, there were equally signs of extravasation, and about five inches from the pylorus four ulcerations, in a row, of the size of threepenny and fourpenny pieces, looking in some respects like abrasions. Blood extravasations are, as is well known, common in all putrid fevers. Dr. Greenfield, in a lecture on Anthrax published in the Lancet in the early part of 1881, states that he noticed similar ecchymotic or hemorrhagic conditions in the carcases of cattle which had become infected with anthrax from drinking infected water, and that the ecchymoses were invariably found to be due to thrombosis of the vessels by means of the germs called "bacilli," the bacilli being frequently also found in the capillaries of the lungs and spleen. While in the internal anthrax, known as woolsorters' disease, Dr. Greenfield noticed a similar state of matters as I discovered to exist in some of my dogs operated upon—namely, that there were ecchymoses and hemorrhages along the course of the trachea. He even in some cases found extensive hemorrhages in the bronchial glands, and in all bacilli were detected. The thymus gland in my experiment was decidedly inflamed.

The blood of this dog was found coagulated both in the heart and large vessels, and when examined with the microscope nothing was noticed abnormal about it, except that the walls of the red corpuscles on the addition of water broke down with unusual speed, and allowed the escape of their contents. Bacteria and bacilli, being unknown organisms in those days, were of course unlooked for, but had any germs been visible without special preparation, it is probable they would not have escaped detection. However, the fact of none having been seen by me does not prove that none were present; for germs may be present in abundance in blood, and yet escape observation even when looked for, unless a special means is adopted to render them visible. Thus Koch tells us that in the blood of a mouse which he poisoned by injecting under its skin putrefying blood, he could detect no organisms by the ordinary means of microscopic investigation; whereas after using aniline dye with a good illumination he found lots of bacilli, even within the white corpuscles.

With regard to the condition of the blood in this dog, it may be mentioned that in the first place, before the injection was made, half an ounce of blood was withdrawn from the jugular vein, and to it was added some of the same fungi and sporules as were injected. After being well mixed together, the mixture of blood and fungi was put on one side, in order to observe what would occur in it, and to compare the result with blood which had been impregnated with the fungi and sporules in the living circulation of the animal.

On the blood that had the fungus added to it after its removal from the body being examined, abundance of both fungus filaments and fungus spores was found in it, whereas, strange to say, not a single fungus filament, and only a very few fungus spores, could be detected in the blood taken from the dog after death; which proved not only that the spores did not develop, but even that the fungus filaments and the spores were destroyed in the circulation of the living animal in the brief space of forty-four hours. Thinking that the fungus might have only been arrested in its passage through the minute capillaries, and knowing that if so the easiest plan to detect fungi filaments and spores in the capillaries would be in those of the lungs, different portions of the lung tissue were carefully examined under the microscope by myself and several of my pupils, but not a vestige of fungus filament or fungus spore was anywhere to be met with. Nevertheless, the blood had been very materially affected by the introduction of the fungus into the living circulation, for it was found by a carefully-conducted experiment in my gas laboratory at University College that it had lost its power of becoming scarlet on being oxygenated by exposure to atmospheric air. It even only slowly oxygenated when put into a receiver with pure oxygen. In the second place, it contained an immense number of white blood-corpuscles. In the third place, it contained a number of large, pale, *nucleated* cells, identical in morphological character with what are known to morbid anatomists as exudation corpuscles, which showed beautiful nuclei on the addition of acetic acid.

This experiment, on being repeated, did not yield such striking results. Yet, as it was in every other respect identical, I came to the conclusion that the soil the fungus grows in, and the food it lives upon, has a material influence on its constitution and properties, for I consider that the gentle and repeated washings to which the fungi had been subjected were sufficient to remove from their surface all the toxic animal micro-organisms of the fluid in which they grew; certainly, at least, not to leave behind adhering to the filaments and spores sufficient of them to have produced death in a healthy

animal within forty hours after their introduction into the body,—the adoption of which idea, the belief in the latter theory would, of course, necessitate.

From the results of these experiments on vegetable organisms the following conclusions were drawn:—

(*a*) That certain kinds of vegetable germs are not deleterious — even when introduced into the circulation — to animal life.

(*b*) That certain kinds of vegetable spores can neither develop nor survive in the circulating blood of a healthy animal.

(*c*) A fungus which may have no toxic properties when grown in one soil, may acquire toxic properties sufficient to be deleterious to animal life when grown in another.

(*d*) Certain kinds of fungus spores and filaments, when they produce pathological changes in the animal body, do so by virtue of their inducing chemical changes in the blood, and not merely by mechanically interfering with the vital processes.

(*e*) That the healthy animal organism possesses the power of destroying and eliminating certain kinds of living microscopic spores and filaments of fungi from the circulation.

Some of these conclusions have in a measure been curiously borne out by the results of subsequent experiments made by Continental observers on the inoculation of animals with tubercle. Tuberculous inoculation produced tuberculous deposits, but the inoculation of calves' brains, and other equally benign animal substances, produced nothing but trivial temporary local irritation, the foreign materials introduced being rapidly eliminated from the healthy organism. While my opinion regarding the fungi receiving poisonous properties from the soil in which they grow is confirmed by Dr. George Thin having found (Royal Society's Proceedings, March 3, 1881) that bacteria germs take up from the matters among which they grow even the minute solid particles through their walls.—*Lancet*, *June* 4, 1881, *p.* 904.

[Dr. Harley next turned his attention to the discovery of the "*Effects that might arise from the Injecting of Minute Animal Organisms into the Circulation of Healthy Animals.*" His experiments and remarks on this subject are given in the Lancet, June 11, p. 246. In a third paper he gives in a tentative form an arbitrary "*Classification of the Disease Germs with which we are already acquainted,*" and which we reprint in the following article.]

## 3.—GERM THEORY OF DISEASE.—CLASSIFICATION OF THE GERMS WHICH PRODUCE HUMAN DISEASES.

By Dr. George Harley, F.R.S., London.

As I shall almost immediately take occasion to adduce a few facts which tend to the belief that while some of the presently recognised specific species of human disease-germs may in the end turn out to be either mere varieties, or even simply different gradational stages in the developmental career of one and the same species of organism, as well as to show that it is almost certain that other, as yet unknown, species of disease germs will shortly be discovered, I do not desire it for one moment to be supposed that I subjoin the following classification of human disease-germs as anything more than a tentative one. But I do so, nevertheless, without reluctance, well knowing that even an imperfect classification of things always materially assists in advancing the progress of scientific truth, and I leave it for my readers to value or to condemn it, according to their knowledge and discretion, feeling sure that it will at least prove useful to both observers and readers until a more advanced stage of our knowledge furnishes us with a better.

*Table of Human Disease-Germs.*—(*a*) Brownian granules: Minute, opaque, solid, moving spherical bodies of the size of 1-50,000th of an inch in diameter, existing normally in buccal mucous cells, and white blood-corpuscles, and abnormally in living blood-serum, milk, melanotic matter, and urine, as well as in all decomposing animal fluids.

(*b*) Vibriones: Strings, often branched, of equally minute particles, in constant motion. Not existing in normal fluids, but only and always in decomposing animal fluids—in or out of the body—such as blood, milk, serum, and urine, as well as in abnormal living contagious liquids—gonorrhœal, syphilitic, ophthalmic, and small-pox pus.

(*c*) Micrococci: Homogeneous, spherical pellucent bodies, larger than Brownian granules, usually floating free, either singly, in groups, or like vibriones in bead-strings. Found under pathological conditions, such as in sheep-pox and small-pox pus, as well as in the living blood itself in small-pox and putrid fevers, and in pus of suppurating wounds. In diphtheritic deposits numbers of micrococci are found (Oertel, Klebs, &c.) as well as in the lymphatics and lymphatic glands of diphtheria. Nepveu found micrococci in the blood (Jahresbericht, 1872, i., p. 254), and Orth in the bullæ of erysipelas (Arch. Exp. Path. u. Pharm., i., p. 81).

(*d*) Bacteria: Sausage-shaped germs, sometimes occurring singly, frequently in longer or shorter strings, like strings of Cambridge sausages—sometimes jointed. Met with in the living fluids under pathological conditions, and among all de-

composing animal matters (in the blood of chicken-cholera and cattle-plague, Pasteur says). Birch-Hirschfeld thinks the unhealthiness of a wound is in proportion to the number of bacteria it contains. He says that he also found them in the blood of pyæmia, but as he speaks of them as being spherical (=microsporon septicum), his remarks have reference to ordinary micrococci.

(*e*) Spirilli: The name of spirilli has been given to a species of long hair-like germs of not more than 1-3000th of a line in diameter, of a corkscrew-like form. Like vibriones, they are generally found in active movement, and have been detected as special organisms in the blood in cases of "woolsorters' disease" and relapsing fever.

(*f*) Bacilli: Baton or short rod-like germs, of which there are three distinct pathological varieties, although they are exactly the same in appearance, sometimes occurring single, sometimes double, sometimes multiple, sometimes branched. The varieties are respectively named bacillus malaria, bacillus anthracis, and bacillus septicæmia.

Lastly, though not least, I add to them—

(*g*) Germ-spawn, of all kinds, a fine granular matter, frequently spoken of as clouds of granular débris, which, although infinitesimally minute, has nevertheless specific pathological characters, and is always visible in all fluids containing mature germs, in which the germs are seen floating in it as if in a cloudy sea when examined under a twelfth of an inch lens. It is even generally to be readily seen with a good eighth and a proper illumination. It is met with wherever mature germs exist, and is easily found in decomposing liquids, such as blood, urine, and milk, as well as in softening tubercle, cancer, &c. Although the various kinds of spawn are entirely indistinguishable from each other by the microscope, they are nevertheless organically distinct in their nature, for when injected into healthy animals, they each give results according to their special kind—small-pox causing small pox, tubercular causing tubercle, putrid blood causing fever, &c., &c. It cannot surprise us that all germ-spawn is alike in appearance when we know that the formative cells in almost every bird's egg, fish roe, and animal's ovum, are alike, and yet that each egg, roe, and ovum develops according to physiological law into a different species of mature animal.

As is seen in the above table of germs, I make a distinction between Brownian granules and micrococci, vibriones, and bacteria, which many observers imagine are only different stages of development of the same organisms. Therefore, lest my opinion should mislead, I must here throw out a word of warning, especially to the young observer of microscopic organ-

isms, and that is, never hastily to jump to the conclusion that he has discovered a new species when he encounters a family of germs differing either in colour, size, or form from those that have been already described, for just as the black and the white turkey, the tiny Shetland pony and the gigantic dray-horse, the tail-less Manx cat and the long-tailed Londoner, the nut-sized wild turnip, and the enormous field swede, the standard and the drooping ash, in spite of their respective dissimilarities, are each in its turn mere varieties of the same species, the results of feeding and breeding; so in many instances the variations in the size, colour, and form of microscopic organisms are but the result of a changed habitat and an altered diet. Or, perhaps the variety in size, form and colour may be the mere normal result of different stages in their progressive development, just as we notice strange mutations occur during the life history of the common parasitical tapeworm, which appears as a measle at one time, a globular hydatid cystic at another, and a long segmented tapeworm at a third. In fact, I am not at all sure that some observers do not think that, even in spite of vibriones (chain-like granules), micrococci (spheroidal bodies), bacteria (sausage-shaped elements), and spirili (corkscrew-like filaments), not only differing in form, but in pathological properties, they may perhaps in the end turn out, like the hydatid and the tapeworm, to be mere gradational morphological forms of development of the same organism, and their differing pathological results be found to be entirely due to the situation they grow in and the food they eat. In a paper communicated by Dr. George Thin to the Royal Society (March 3, 1881), it is said that in cultivating bacteria artificially he had seen the circular spore or coccus elongate into a rod, then a long rod, and finally change into a tube, and become filled with new spores or cocci. Moreover, he noticed that they sometimes changed their colour by taking into their interior the pigment in which they grew. Koch had already (in 1876) made known the fact that vibriones, and chains of micrococci, break up into separate spheroidal germs.

However, it is still an undeniable fact that there do actually exist a variety of kinds of diseased germs differing not only morphologically, but also still more, as shall be shown presently, in the pathological effects they produce; equal care is necessary to prevent the young observer from shipwrecking his bark on either shore of the somewhat intricate germ channel. For be it noted that we never by any chance hear of a typhoid infection germ under any circumstances inducing scarlet fever, or a scarlet fever infection germ in any case whatever leading to an attack of small-pox; while on the other hand, although we may have measles mixed up with scarlet fever, and scarlet fever

with diphtheria, it does not, I think, in any way prove that it was one species of germ that gave origin to the two kinds of diseases, but merely that the patients so affected have at one and the same time become inoculated with two entirely different forms of disease germ. Nay more, I shall presently adduce evidence to show how different germs, though introduced into the human body at the same moment and in the same fluid—as happens when syphilis or glanders is introduced along with vaccination lymph—will hatch, develop, multiply, and run through their whole pathological career, not only quite independently of each other, but without even so much as interfering in the slightest degree with either the course or with the effects of each other.

As I have a good deal more to say on this subject I shall leave it for the present.

Lest, notwithstanding all this, some of my readers may still think that in the case of such exceedingly minute organisms, many of which are almost morphologically identical, it is drawing too fine lines of distinction to give them different names, I may as well inform them that this has not been done on insufficient grounds, as they will be able to judge for themselves when I tell them that there is quite as great a difference between the constitutions even of two kinds of bacilli—notwithstanding their apparent morphological identity—as between a tiger and a zebra, two animals closely resembling each other not only in size and in form, but in having a tail, four legs, as well as in having striped skins, yet each has, nevertheless, an entirely different constitution; for while the one can only subsist on vegetable, the other can ouly exist on animal, food. Quite as great a difference in constitution is found in two kinds of bacilli. For while the bacilus septicæmia flourishes luxuriantly in an infusion of hay, it perishes at once in the serum of the blood of a living animal; while the bacillus anthracis refuses to develop in hay infusion, yet grows and multiplies apace in living blood. What is the food of one germ thus appears to be the poison of the other; yet, strange to say, notwithstanding this apparent dissimilarity in constitution, both the septicæmic and anthracic varieties of bacilli grow and thrive in a dilute watery extract of muscle. So it must be admitted that even as regards their food they possess at least, some points of affinity. In a paper in the British Medical Journal of 1880, Lister says that Buchner having observed that spores never formed by the bacillus growing in defibrinated blood, it occurred to him that, perhaps, if it were transferred to extract of meat, and induced to form spores there, the modified organism might yet grow in the blood of a living animal. The carrying out of this idea was

crowned with success, and, both in the mouse and in the rabbit, Buchner succeeded in producing disease by injecting various different quantities containing the organism into different animals. When large quantities were introduced the animals died rapidly from the merely chemical toxic effects of the injected liquid; but, in some instances, after the period for these primary effects had passed away, a fatal disease supervened, attended, as in anthrax, with great swelling of the spleen, the blood of which was found peopled, as in that affection, with newly-formed bacilli, and the constituents of their spleens affected in this way were found to communicate anthrax to healthy animals, just like those of animals which had died of ordinary splenic fever. The bacillus malaria is said by Klebs and Tommasi-Crudeli (1879) to infest the soil in the malarial districts round Rome, and when introduced into the bodies of healthy rabbits to induce in them an intermittent fever, while Marchiafava has supplemented these observations by saying that in cases of fatal malarial fevers he has found bacilli in the blood. There is yet another kind of (an unnamed) bacillus, which has not only been met with in the false membrane of the fauces, but in the kidneys and urine in cases of diphtheria.

Nearly all pathologists now admit that although the bacillus anthracis is undoubtedly the cause of woolsorters' disease and splenic fever, and the bacillus septicæmia that of metastatic abscesses, the one form of germ has no effect whatever in producing the other's form of disease. So I think that none of my readers will longer hesitate to acknowledge that although the different bacilli have identical microscopic characters, they are essentially differently constituted forms of disease germs, and consequently have a right to be distinguished by different names.

Again, while bacteria and micrococci closely resemble, except in size, Brownian granules and vibriones, the latter are generally to be found in active movement, the former are not. Brownian granules occur in healthy tissues, micrococci never do. While bacteria are abundantly met with in contagious pus, micrococci are only common in what is called laudable pus, such as is obtained from suppurating wounds and acute abscesses.

It must not be supposed that visible germs must be necessarily found in all purulent, and other kinds of contagious fluids. For, on the contrary, in vaccine lymph, for example, it oftentimes happens that none are to be detected by the microscope. In such contagious fluids I believe that the germ-spawn is alone present, and that unless germ-spawn were actually present the communication of disease by the lymph

would be entirely impossible. Even in the pus of thirteen typical chronic — so-called cold — abscesses, whose duration could be measured by months, and which arose from diseased bones, scrofulous glands, &c., Dr. Ogston says that he could find no germ organisms, although in pus found in other kinds of abscesses he detected them readily (British Medical Journal, March 12, 1881). Although every medical man knows, or at least ought to know, that the most benign and healthy physiological materials may become malignantly pathological, from either occupying an abnormal situation, or even a normal situation in an abnormal quantity, it may be as well for me here, in connection with the germ theory, to add a fact not as yet sufficiently recognised — namely, that the law that healthy matter when out of place is a morbid product must never be lost sight of in studying by experiments on animals the pathological action of germs. Thus, for example, although Brownian granules are not only harmless, but actually normal constituents of the buccal secretions, they are not only abnormal but virulent pathological products when placed in the subcutaneous cellular tissue. As before said, Brownian granules, in active living movement, are to be met with both in the normal mucus cells of the saliva and the white corpuscles of the blood in perfectly healthy individuals. This was first demonstrated to me six-and-twenty years ago by Professor Bischoff, one day when I was calling upon him in Giessen, putting some of the saliva from his own mouth under the microscope, and showing me the Brownian particles in active movement in the mucus cells. Strange to say, we failed, on the same occasion, to find any in active movement in the mucous cells from my own saliva. (N.B. The movement is only visible under a high power, and the higher it is the more distinct it is.) Brownian particles in active movement are not only met with in putrid fluids, but in abnormal quantity in living fluids in disease. I particularly observed this in a case of pyæmia, where there was present an immense excess of white corpuscles in the circulation. I say white corpuscles; but I might have called them mucous corpuscles or even pus cells, for in so far as their appearance was concerned they had as much right to be called the one as the other. For had I seen the same cells in saliva I would have called them mucous corpuscles. While had I seen them in fluid taken from an abscess I would unhesitatingly have named them pus cells, and it is only because I found them in blood that I have called them white corpuscles. Anyhow, they contained an unusual quantity of moving Brownian granules.

Hence we see it is not always the mere presence of germs, but the *quantity* of the germs in the situation which gives to

them their pathological significance. The presence of Brownian granules and vibriones in living fluids and tissues, again, is always to be regarded as evidence of morbid action. For, although always to be met with in normal animal fluids—blood, milk, urine, &c.—as the result of decomposition out of the body, they are never met with in any quantity in the living tissues or fluids except as the result of disease. Brownian granules, for example, swarm in melanotic cancerous tissues. While, again, in cases of pyæmia they are abundantly met with in the living circulating blood. Saliva contains a ferment which turns starch into sugar, and most probably this ferment is the viable, active Brownian granules it contains.

The fact above alluded to, that healthy matter out of place is an abnormal pathological product, has recently received remarkable confirmation by the experiments of Vulpian, who, in a note to the French Academy, says that he injected under the skin of rabbits saliva collected at the very moment of the experiment from perfectly healthy individuals; and this injection killed the rabbits so inoculated in forty-eight hours. The blood of these rabbits was found filled with microscopic organisms, among which was found a special organism, discovered by M. Pasteur in the course of his experiments with inoculation of the saliva of a child who had died of rabies. One drop of this blood, diluted in ten grammes of distilled water, and injected under the skin of other rabbits, also brought on the death of these animals, the blood of which was similarly filled with microscopic organisms; while other rabbits, not in the same way predisposed to the pathological effects of the saliva germs, when operated on under identical conditions with the same saliva, experienced no ill effects from their inoculation.

Now, although not a single word is here said about Brownian granules, as these are the only living micro-organisms normally existing, as I have just shown, in human saliva, I have no doubt it was owing to their breeding and multiplying abnormally in the subcutaneous cellular tissue of the rabbits that induced their death. The probability of this being the correct theory will become more apparent as we proceed with the consideration of the life history of microscopic germs.

There are three forms of disease in which the saliva assumes most virulent characters—glanders, rabies, and syphilis; each of which is due to the development in it of an entirely different specific germ organism. Numbers of other very common affections might be pointed out as being due to specific forms of disease germs: as, for example, an influenza cold, which is well known to be such an infectious disease that even if a cat begins to sneeze from it the chances are that it will soon spread itself

to every human member of the household. It is said by some Frenchmen to be due to the fungoid mould called the Coprinus domesticus; while the common thrush in the mouths of children —the "muguet" of the French—is thought to be due to the Botrytis basiana, the same kind of fungus which produces the potato blight and the vine disease, as well as the epidemic cutaneous diseases of salmon and silkworms.

It must not be for one moment supposed that we are already acquainted with all the different species of disease germs, and that all morphological forms subsequently to be met with are to be regarded as mere varieties of known forms; for on the contrary, I opine that many more "perfectly distinct species" may yet be discovered. For example, the milk from a dairy belonging to a reformatory school of over 150 boys, near Aberdeen, in the begining of April 1881, appears suddenly to have become impregnated with poisonous germs, for within a few days ninety families who received their milk from the reformatory where the cows were kept were affected with what appeared to be a new disease. Over three hundred persons were attacked, and only twenty of the families supplied with milk escaped. No case of the disease was found in any family that did not receive its milk-supply from the reformatory dairy. The persons were attacked with severe rigors, which might last several hours, or even for a day; these were followed by marked febrile symptoms. The tonsils were slightly enlarged, but there was no false membrane; and a marked feature was the swelling of the lymphatic glands of the neck and those immediately above the clavicle. The prostration was extreme. The febrile symptoms passed off in a few days; but in a great many cases there was a sudden relapse, and the relapse was often more severe than the primary attack. In a few cases the attack was slight, but it proved fatal in three cases where the patients were old and frail, and unable to recover from the prostration. A peculiarity was that the officials of the reformatory were affected, while the boys almost entirely escaped. The boys got skimmed milk while the officials were supplied with sweet milk. The supply of milk was ordered to be stopped, and the spread of the disease stopped as suddenly as it began. Commissioners investigated the matter, and the evidence clearly showed that the water-supply to the dairy-farm was not satisfactory, for all the water for the cows came from a large and practically uncovered cistern, which was placed in the byre where thirty cows were kept. The water, on being analysed, was shown to be bad, but still that was not sufficient to show how the disease originated. It was not shown that this water was added to the milk, though some of the milk-pans may have been washed with it. The commissioners—Mr. Andrew Rutherford, advocate,

and Dr. H. D. Littlejohn, of Edinburgh—say on the authority of Professor Ewart, who examined the milk microscopically, that it contained micrococci and bacteria organisms, which seemed in some respects to be of a character entirely new to science. But, as far as the evidence went, they declined to say how these organisms came into the milk. A post-mortem examination was made of the body of one person who died from the disease; but no organisms were found either in the blood or in any of the tissues. Nor were any organisms found in the blood of patients suffering from the disease.

After what was said regarding the variations in form of microscopical germ organisms, the above idea of the species found by Professor Ewart being "entirely new to science" requires corroboration before it can be implicitly accepted. The only collateral support it has is in the fact that the pathological symptoms, the organisms produced in the persons they affected, were in themselves of such a most unusual and anomalous kind as leads to the belief that in all probability their exciting cause was equally uncommon. Further and more complete investigation will alone reveal the truth.—*Lancet, June* 25, 1881, *p.* 1020.

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## 4.—ON THE BATH TREATMENT OF SCARLET FEVER.

By D. Manson Fraser, M.A., M.D., Assistant Medical Officer in the Metropolitan Fever Hospital, Homerton.

At the present day, although the treatment of scarlet fever by baths may be occasionally employed by English practitioners, it has not hitherto received the careful investigation accorded the same treatment applied to enteric fever.

To remedy this state of matters, therefore, it was proposed, in the Metropolitan Fever Hospital at Homerton, to put the treatment thoroughly to the test; and with this view it was commenced toward the end of last year.

*Mode of Administration.*—Although the ordinary bath was used, occasionally at least, by some of Currie's disciples,—by Dr. Gregory of Edinburgh and others,—yet Currie himself seems, in almost all cases, to have preferred the affusion. "The plan I follow," he says, "is to strip the patient and dash five gallons of the coldest water to be procured over his naked body."

The affusion is obviously nothing other than a modified form of the bath. It has been the favourite means of applying the water treatment to scarlet fever in France, and some French writers hold that it has peculiar advantages over the other methods. It is, however, more inconvenient, besides being less effective than the ordinary bath, and the latter has, therefore, been exclusively used at Homerton.

The baths used may be divided roughly into three classes:—

(1) Warm baths, of which the temperature was between 90° and 80° Fahr.; (2) Ziemssen baths, which were gradually cooled during the immersion of the patient; and (3) Cold baths, of a temperature of from 60° to 70° Fahr.

The duration of the baths was not more than five to ten minutes, because, as the patients were children, a longer immersion was deemed inadvisable.

For the older children, the method adopted was the same as the method used for adults in enteric fever, as described by Dr. McCombie in the Practitioner, 1876 (*Retrospect*, vol. lxxiv, p. 346.) "An ordinary plunge-bath is filled with water of the desired temperature. The patient, previously enveloped in a dressing gown, is wheeled from the ward to the bath-room, bed and all, on a bed carriage, and lifted in by two attendants." "If it is desired to lower the temperature of the water, while the patient is in the bath, we effect this easily and noiselessly by having an indiarubber hose attached to the cold tap, of such a length as to reach well under water, so as not to alarm the patient by the sound of water running from a height, as well as to facilitate the equable distribution of the water throughout the bath."

Young children were carried, wrapped in a blanket, to the bath-room and immersed. When the bath was over the patient was at once returned to bed, the process of drying being thereafter effected.

In the case of the younger children, who seemed generally to be alarmed at the novel sensation of floating in water, the water in the bath was used only of such a depth as to let the patient's body rest on the bottom.

It was, occasionally, deemed necessary to administer stimulants during immersion to prevent collapse. A small quantity, also, was generally given after the patient was returned to bed, with a view not only of increasing the cooling effects of the bath, but also of aiding the production of sleep.

*Indications and Contra-indications.*—In the application of the bath treatment in scarlet fever, we have been guided by two chief indications. These were furnished by the height of the temperature and the condition of the nervous system.

In Germany it has been the custom to trust solely to the temperature as an indication for the use of baths in fever. "Whenever the temperature in the rectum reaches 103°, or in the axilla 102.2°, a cold bath is given. In children, or in persons whom one has reason to suppose capable of great resistance to the influence of heat, the temperature may be placed higher, say 104° in the rectum, or 103° in the axilla. In those, on the contrary, with less than average resisting power, it may be well to employ the bath before so high a temperature has

been reached, and, according to the circumstances of the case, give a shorter bath, or a warmer one, or the gradually reduced bath of Ziemssen." This exclusive reference to the temperature has been carried too far, and has been condemned by English writers. But it is a question whether the condemnation has not been too sweeping, and, while not forgetting the importance of the indication afforded by the nervous system, yet, I think, the temperature, even of itself, must always be carefully considered. Excessive heat of body, we know,—by whatever cause it may be produced,—is a grave danger. With a rise in temperature, the nitrogenous tissues of the body, which wear but slowly at the ordinary temperature, begin rapidly to oxidize ; the muscular tissue, including the heart, undergoes degeneration, and an excess of histolytic products accumulate in the blood. Hence results, if the pyrexia and its consequent tissue changes be prolonged, that condition known as the typhoid state. To prevent the possible—nay, probable—onset of this dangerous combination of symptoms is surely a laudable aim of treatment. I believe, and have acted on the belief, that, whenever the temperature persists at an excessive height, even if there be present no great degree of nervous excitement, the baths should be administered.

On the other hand, as there may exist a considerable rise of temperature without any serious nervous disturbance, so there may be serious nervous disturbance without any great degree of pyrexia. But this nervous excitement is itself a grave symptom and calls for treatment. The baths therefore have been administered whenever there was present any considerable degree of nervous excitement, even though there was no great rise of temperature. In such cases the warm baths were generally made use of.

The coincidence of these two states, viz., great pyrexia and great nervous excitement, have afforded, of course, a still stronger indication.

Other indications have been laid down, but they depend more or less directly on the two already described. The condition of the pulse I prefer to consider as a contra-indication.

In this connection it may not be out of place to note a general rule (with, of course, numerous exceptions) that seems to hold good in epidemics of scarlet fever. If those members of a family who are first attacked by the fever suffer severely, then also will most (rarely all) of the other members—brothers or sisters—when attacked suffer severely. I should think, therefore, that in the case of the latter, the bath treatment might be commenced earlier than it would be under ordinary circumstances. I have, however, had no practical experience of its effects in such cases.

As regards contra-indications, the most important is afforded by feebleness of the circulation. When the heart's action is weak and the pulse feeble the bath is not to be thought of.

If the bath produce a high degree of excitement, as it occasionally has done in the case of our youngest patients, the treatment should not be persisted in.

Bronchitis, or slight pulmonary congestion, have not been regarded as contra-indicating the baths.

*Effects on the Mortality.*—Of the cases, two died. This would give a mortality of about ten per cent. For the year 1820, the percentage mortality of scarlatina at Homerton was eleven, so that, as far as the cases so treated show, the bath treatment has the advantage over other methods. When it is considered that the cases submitted to the treatment were all of a severe type, and included no mild cases, the advantage is seen to be more decidedly on the side of the bath treatment.

The small number of the cases precludes any definite conclusion as to the effect on the mortality of the disease. It may well be expected, however, that a treatment which controls in so marked a degree the two prominent symptoms, viz., high temperature and nervous excitement, will have some beneficial effect on the general mortality of the disease.

In conclusion, although I do not believe that the bath treatment is a specific for scarlet, or any other fever, yet I do regard it as a valuable instrument in combatting the disease. Any method of treatment which can reduce temperature and change sleeplessness and delirium into quiet rest, which averts the necessity for the use of the knife, and holds out a hope of the prevention of deafness, ought to have a recognised place in the therapeutics of scarlet fever. This must be my excuse for laying this paper before the profession.—*Practitioner, July* 1881, *p.* 34.

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## 5.—USE OF EUCALYPTUS GLOBULUS IN TYPHOID FEVER.

By Benjamin Bell, Esq., F.R.C.S.E.

This short note is supplementary to a former one published in the Edinburgh Med. Journal (*Retrospect*, vol. lxxvii, p. 329.) After mentioning in that paper the remarkable benefit which, in my experience, had attended the administration of the tincture of the *Eucalyptus globulus*, or blue gum, in certain cases of what appeared to be very formidable disease of the stomach, I suggested that the same remedy might be found advantageous in cases of typhoid fever. My grounds for forming this anticipation are obvious enough. The drug possesses *antiseptic* qualities; it acts, as we have seen, beneficially upon the lining membrane of the stomach, perhaps of the duodenum. The characteristic lesion to be chiefly dreaded in typhoid fever is an irritated con-

dition, a congestion, an inflammation, passing into ulcers or sloughs of the small follicular glands of the intestinal canal.

Ever since venturing to make the suggestion referred to, I have kept it in view, prescribing a teaspoonful of the tincture of *eucalyptus*, well diluted, at regular intervals of three or four hours, in all the cases of typhoid fever which have occurred. My distinct impression is that, as a rule, the duration of the disease has been shortened, and the tendency to diarrhœa diminished. If mixed with a large wineglassful of water, the medicine is far from disagreeable to the patient, and may be steadily administered in the intervals of nourishment without becoming irksome. By food, I mean milk and lime-water. As each dose of the tincture contains a drachm of spirits of wine, it is worthy of consideration that we are, in fact, giving a slight stimulant, not only well diluted, but possessed of a medicative property at the same time. This may therefore come in lieu of those other stimulants so often deemed desirable, at least in the advanced stages of the fever, while, in the intervals of the bland milky nutriment, it will be brought into immediate contact, as an antiseptic, with the seat of threatened ulceration and sloughing.

In private practice, with a comparatively small number of cases, it would be rash to speak dogmatically as to the results of treatment; but a reliable opinion might be arrived at, were physicians connected with a large hospital which admits fever cases to employ the remedy in every *alternate* case under their care. If those patients who got the medicine were found—after its employment in a considerable number of cases—to have made more rapid recoveries with fewer bad symptoms than those from whom it was withheld, it would be reasonable and safe to draw an inference in its favour.

I may mention that my confidence in the *eucalyptus* in cases such as those formerly described continues unabated. Indeed, it has been strengthened, not only by the results in cases coming under my own observation, but also by several aggravated examples throughout the country reported to me by the first patient to whom I administered it. He had benevolently recommended it, on his own responsibility, when he heard of persons suffering similarly to himself, before his restoration to health.—*Edinburgh Medical Journal, Aug.* 1881, *p.* 149.

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## 6.—ON THE INFLUENCE OF CONSTITUTIONAL DRAINS UPON THE DEVELOPMENT OF CANCER.

By Reginald Harrison, Esq., F.R.C.S., Surgeon to the Liverpool Royal Infirmary.

The frequent appearance of cancer in women at a time of life coincident with the withdrawal of a discharge has a significance

when coupled with somewhat analogous circumstances. Of the considerable number of cases of cancer that have fallen to my lot to see in a town where the opportunities for doing so are ample, I can recall to mind several where, after removal of the local disease has been effected, some independent discharge, such as a sinus or a fistula, accidentally followed, which so long as they existed seemed, as far as I was able to trace the cases, to ward off a recurrence of the malignant disease.

Though the patient in the following case has remained free from a return of the disease for only the comparatively short period of twenty-one months, yet it was just one where there was every reason to believe, from the extent to which the skin was implicated by scirrhous deposits, in addition to other circumstances, that recurrence would probably be rapid. One case is that of Elizabeth O—, aged forty, who was referred to me by Dr. Davidson, and whose breast I removed at the Infirmary, on April 8, 1879. It was necessary to sacrifice a large portion of the skin, so much so that the wound has never completely closed. Beyond this small wound, about the size of an ordinary issue, she has suffered no inconvenience whatever, and there is no appearance, either in the operation wound or elsewhere, of a return of the disease. She has gained flesh in spite of the slight purulent running I have mentioned, and looks robust and well. I have requested her to report herself from time to time, and not to allow the issue to heal. Though the time since the operation is far too short in this case to draw such a conclusion as I could wish, yet if recurrence were to take place almost immediately, I should still maintain, having regard to the nature of the primary disease that was removed, that recurrence had been considerably retarded by the protracted suppuration of a healthy sore. This case happened also to afford me the opportunity of referring to this subject in the course of my clinical teaching.

On Oct. 7, 1879, I removed the breast of Mrs. W—, a stout lady, for scirrhus, with the assistance of Mr. Byerley and Dr. Craigmile, of Seacombe. She also was of such a habit of body that I should not have been surprised to hear that recurrence had taken place within rather less than the average time. In the following month she consulted me for a fistula in ano, which had suddenly appeared, and which I declined to interfere with. Writing to me on Jan. 29, 1881, nearly sixteen months after the operation, Dr. Craigmile states, "She keeps very well and quite free from anything like a return either in breast or glands. The fistula now and then discharges very little, but gives almost no inconvenience."

Speaking generally, I have observed that when the removal of a cancer has been followed by a prolonged suppuration of

the operation wound and its tardy closure, recurrence has been longer delayed than when union has been rapidly effected.

I remember a case occurring in 1860, where, under the late Mr. Long's direction, I removed a scirrhus of the breast by chloride of zinc, which he was then trying in the infirmary. The action of the caustic was so potent as to damage the surface of one of the ribs, and for some years this patient lived with a persistent sinus which at times discharged minute portions of dead bone. With this exception, for seven years I know she was in excellent health, and had no recurrence of the disease. About this time she left for America, and I have lost sight of her.

We must all have seen cases of malignant disease which have first shown themselves, in apparently middle-aged healthy persons without any known constitutional taint, a very short time after the sudden arrest of some long continuing drain, such as that of a fistula, or of bleeding hemorrhoids. I can recall several. Again, the first appearance of cancer has been frequently observed in persons such as those I have mentioned, immediately after they have exchanged a life of bodily and mental activity for one of comparative indolence and luxury. Some of the most rapid and uncontrollable cases of cancer I have seen under these circumstances. For the most part cancer seems the more frequently to appear in the plethoric and torpid rather than in the spare. That a change of type in the individual who may be suffering from malignant disease is not unfrequently attended with some alteration in the growth has often been noted, and has served to explain instances where a cancer has ceased to show any signs of active progress. I believe that it would not be difficult to show that cancer is on the increase; that it is far more common amongst us now than it was one hundred years ago. If such a statement is correct, what bearing has it upon the advance of civilisation, of which we are disposed to boast?

It has often occurred to me whether our forefathers, who were shrewd observers, if they were not advanced pathologists, in the practising of the regular bloodlettings were quite as unreasonable in their views as to the "humours of the body" as we at the present day are disposed to regard them. Has the use of drains and of setons, after the removal of the obvious signs of cancer, had a sufficient trial? I am disposed to think that it has not, and, further, that there exist grounds for their employment under certain conditions. I am now making use of them; as, however, it is desirable to obtain as much collateral information upon this point as possible, to avoid the employment of treatment which has previously failed to give any encouraging results, I have taken the opportunity, when the attention of the profession has been more than

usually directed to this subject, to refer to it in these columns. Of the various plans of treatment that have been adopted with the view of preventing the recurrence of cancer, that of setons and issues will, I think, be found to afford the most promising results. Writing upon this subject, the late Mr. C. H. Moore remarks (Holmes's System of Surgery, vol. i., p. 605) "a greater good may be asserted to have attended the establishment of a slight drain from some part of the surface which is near enough to influence the locality of the disease, *without itself being liable to taint* [the italics are my own]. The existing evidence appears sufficient to warrant the insertion of a seton beneath the shoulder, after the patient has recovered from the effects of the operation of removing a scirrhous mamma."

Whether this deduction is drawn from the experience of the French surgeons Rayer and Boyer I cannot say; but if it were, and having regard to the very imperfect manner in which the primary disease was often removed before the general introduction of anæsthetics into surgical practice, I should not be disposed to think that it represented the full amount of benefit which might accrue under the most favourable circumstances—that is to say, where a complete removal of all tissue obviously infected with cancer had been accomplished. One condition necessary to the obtaining of even such a partial success as the postponing of recurrence implies is obviously dependent upon the fulfilment of this.

I cannot help agreeing with those who think that the fluids of the body have more to do with the production of malignancy than the tissues; and, if this be so, may not the initial lesion resolve into one where "supply and demand" are the most important factors?—*Lancet*, *July* 2, 1881, *p.* 7.

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## 7.—ON CHIAN TURPENTINE AS A REMEDY FOR CANCER OF THE FEMALE GENERATIVE ORGANS.

By J. W. Hulke, Esq., F.R.C.S., Surgeon to the Middlesex Hospital.

It is obligatory on the surgeons in charge of these cancer wards to examine into the claims of all alleged remedies for cancer brought before the profession; and during my tenure of office I have made trial of several escharotics, of condurango, of Beneke's dietetic method, of arsenic applied topically and also exhibited internally, as recommended by Esmarch; and lastly, of Chian turpentine, introduced to our notice as a new remedy for the treatment of cancer of the female generative organs by Professor John Clay in a very remarkable article published in the Lancet of March 1880, vol. i., p. 477.

After narrating four most striking instances of its apparent

efficiency Professor Clay added the following remarkable words :—"The Chian turpentine appears to act upon the periphery of the growth with great vigour, causing the speedy disappearance of what is called the cancerous infiltration, and thereby arresting the further development of the tumour. It produces equally efficient results on the whole mass, destroying its vitality, but more slowly. It appears to dissolve all the cancer cells, leaving the vessels to become subsequently atrophied, and the firmer structures to gradually gain a comparatively normal condition." Professor Clay found Chian turpentine "an efficient anodyne, causing an entire cessation of pain in a few days," and, as prescribed by him, it appears to have been no less efficient as a hæmostatic. The idea of its selective action upon the cancer cells appears to have been suggested by the copious, thick, ropy vaginal discharge which, concurrently with wasting of the cancer, he found attended its use. Recommended by a surgeon of position in an article in a leading medical journal, supported by the narrative of cases showing rapid improvement, not to say cure, setting forth such a plausible hypothesis of its *modus medendi*, I could not hesitate to try it.

The result of this trial completely demonstrated to my own mind, and convinced all who watched the practice, that Chian turpentine is thoroughly useless as a remedy for cancer, whether of the female generative organs or of other parts. It was administered during several months to several women suffering from uterine cancer. It was not found to check the progress of the cancer, which in spite of it continued its fatal course. In not one instance did the vaginal discharge assume the thick ropy character mentioned by Professor Clay. As a reputed anodyne it quite failed to lull pain, and during its use opium was found indispensable. With respect to its alleged hæmostatic powers hemorrhages occurred as frequently and as copiously in women whilst taking the turpentine as in others to whom it was not given.

The trial was begun with some Chian turpentine which had been long in the hospital drug-store. When this was exhausted other Chian turpentine was obtained of a first-class drug firm. The characteristics of the latter agreed closely with those given by Pereira. I was informed that the genuineness of this turpentine was questioned by Professor Clay, who asked for and received a sample of it, and who very courteously forwarded to the hospital a sample of what he considered the genuine article. Upon comparison it appeared that Professor Clay's pure specimen agreed very closely with the turpentine with which our trial had been begun. A fresh supply of Chian turpentine agreeing with Professor Clay's sample was procured,

and the trial was continued with this. The formula first employed was that given by Professor Clay, but later the sulphur was omitted. After trying it in uterine cancer it was given to a woman with an epithelioma of the vulva and of the inner side of the thigh at the junction with the trunk, and to another woman with an epithelioma of the back of the thigh. These cancers being open to ocular inspection appeared very suitable for the recognition of its influence, if any, upon the cancerous tissue. It was also exhibited in cases of scirrhus of the female breast, unbroken, and also ulcerated. In not a single instance could any curative influence be discerned. In conclusion it may be added that mastic, the resinous product of another pistacia, has proved in my hands equally valueless as a remedy for cancer.

The following cases are adduced in support of the above opinion. If it should be objected that these and similar cases were too advanced to admit of cure by the Chian turpentine, the objection would hold if by cure is understood restoration of the cancerously affected parts to relatively normal integrity, but if cure is taken to mean arrested growth and waning of the cancerous tissue, and cicatrisation of the ulcer, the objection falls to the ground in face of the explanation offered by the introducer of the reputed remedy, that it acts in an elective manner, seizing on and destroying the cancer cells, since throughout the duration of the tumour cells of every age, from mere germs beginning life to those advanced in senile decay, are to be found.

*Case* 1.—*Cancer of uterus, fatal, notwithstanding the internal exhibition of Chian turpentine during about three months.*—A wizen-faced little woman, aged sixty, was taken into Whitbread ward on March 12, 1880. The uterus was enlarged and fixed; it was so low as nearly to touch the vulva; the cervix was hard, knotty, and ulcerated. There was a copious ichorous very fetid discharge. The first indication of uterine disorder—pain—was noticed about two years previously. On April 8 she began to take the Chian turpentine mixture, which she continued until July. The discharge was always copious and stinking, occasionally more puriform and less ichorous. Her suffering was so great as to need the free use of opium. She became feebler and thinner, and died on August 14.

At the necropsy the uterus was found infiltrated throughout with cancerous growth, and the interior converted into a large sloughy cavity filled with stinking pulpy débris. No secondary cancerous growths were detected in any lymphatic glands or other viscera.

In this case the cancer was still limited to the uterus. In the next case it had infected the lymphatics. In neither

was there any evidence suggestive of a retrogression of the local disorder.

*Case* 2.—A very thin, shrivelled, little blonde, aged fifty-eight, was admitted into Whitbread ward on June 3, 1880. Her womb was low, fixed, its cervix tuberously swollen and ulcerated. The anterior wall of the vagina was similarly implicated by infiltration spreading into it from the uterus. She had an extremely fetid ichorous discharge, and she suffered very great pain, which was principally referred to the sacrum. In the preceding November she had begun to occasionally lose blood and to feel pain in the womb. (Menstruation had ceased in her forty-ninth year.) Chian turpentine (without sulphur) was ordered to be taken three times daily, and as the severity of the pain continued in spite of this, she had opium at night to procure sleep. The disease continued unchecked, and death ended her sufferings on August 9. At the necropsy the uterus and other pelvic viscera were found agglutinated. The uterus itself, and structures immediately about it, were involved in cancerous growth, which on section was found in several places broken down and puriformly softened. The iliac and lumbar lymphatic glands were cancerously enlarged and centrally puriformly deliquescent. Cystitis, suppurative pyelitis, and abscesses in the tissue of the left kidney were noted.

*Case* 3.—*Cancer of uterus, treated with Chian turpentine during about three months.*—A cartridge-bag maker, aged fifty, was admitted into Whitbread ward in April 1880. Her womb was very low in the pelvis, fixed and enlarged. Its cervix was tuberously swollen and ulcerated, and from this a knotty ulcerated infiltration extended into the vaginal walls. She had considerable pain in the sacrum and thighs, and a thin dirty fetid vaginal discharge. The Chian turpentine mixture was ordered to be taken three times daily. This was continued until July without any obvious influence on the progress of the disorder. The free use of morphia was necessary. Circumstances compelled her removal to a parochial infirmary, where she soon after died. Chian turpentine was taken here about three months.

*Case* 4.—*Cancer of womb treated during several months with Chian turpentine; frequent hemorrhages.* — A patient, aged forty-nine, was admitted in August 1879, into Whitbread ward. Her womb was low down in the pelvis, and fixed; its cervix was an ulcerated nodular mass, from which a knotty infiltration spread along the vaginal walls, especially the upper wall. She had a copious fetid ichorous discharge, with occasional large losses of blood; and she suffered much pain in the bottom of the belly and thighs; her bladder was irritable. The disorder progressed, and stillicidium urinæ followed

destruction of the vesico-vaginal septum. On April 1, 1880, she began to take Chian turpentine mixture, and continued this until the end of July. The disease progressed, her sufferings increased, she had frequent hemorrhages, grew feebler, and at length died on August 4, the immediate cause of death being hemorrhage. Her relatives would not sanction an examination of the body.

*Case* 5.—*Cancer of womb; frequent and great hemorrhages; partial removal with scoop; temporary improvement; Chian turpentine given during several months; fatal termination.*—The patient, aged thirty-three, whose raven black hair heightened the ghastly pallor of her face, was admitted into Whitbread ward on March 25, 1880. Since the preceding November she had had large and frequent losses of blood from the womb. The cervix uteri was a large cauliflower-like mass which bled freely on the slightest touch. The body of the uterus was enlarged, but still movable. She said the hemorrhages had begun about ten months after the birth of her last and seventh child two years before. As she was plainly dying of hemorrhage, and the removal of the cauliflower-like mass offered a prospect of checking the loss, it was removed with a Volckman's scoop, with which also the body of the uterus was hollowed out until it was reduced to a thin shell of firm tissue. This large cavity thus made was filled with a plug of absorbent cotton-wool, dusted over with powdered persulphate of iron, with the double object of checking bleeding and causing a superficial eschar. When the latter was thrown off the surface of the wound appeared healthy, and cicatrisation made such quick progress that at the end of a month a small, firm, puckered bluntly conical knob was all that could be felt of the womb. Before long, however, ulceration recurred, and she again began to lose blood. On April 1 she was placed on the Chian turpentine mixture, and she took this with occasional interruptions of a few days until the end of July. In spite of this the disorder progressed and terminated fatally. No examination of the body was permitted.

*Case* 6.—*Cancer of the vulva and thigh; extensive secondary infection.*—Here, the cancer being in part of its extent open to ocular inspection, the case offered an unusually favourable opportunity for studying the influence, if any, of the Chian turpentine on the disorder. A thin, tall, white-haired monthly nurse, aged seventy, was admitted into Whitbread ward on April 10, 1880. Her left greater labium, the vagina to a height which precluded excision, and the neighbouring parts of the inner surface of the thigh were involved in an ulcerated epithelioma. She had first become aware of the disorder about two years previously, and through false shame had only lately

sought assistance for it. Chian turpentine was ordered, and she continued to take it until late in the autumn. The disease progressed, and she lingered on till Feb. 18, 1881, extensive implication of the lymphatic glands having occurred.

At the necropsy, in addition to the cancerous growth and ulceration in the region already mentioned, the left groin was filled with a mass of cancerous lymph-glands centrally softened, distending the skin, which had ulcerated. The femoral vein was plugged. The left iliac and lumbar and the right inguinal glands were cancerously swollen, and there was a small cancerous knot upon the surface of the liver.—*Lancet*, *June* 25, 1881, *p.* 1019.

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## 8.—ON WOOLSORTERS' DISEASE.

By John Henry Bell, M.D., Bradford.

During the investigation which has been made into the cause and nature of this disease, the following facts have been educed.

1. It is not confined to woolsorters, but affects other classes of workpeople who manipulate the wool or hair after it has been sorted. Fatal cases have been observed in packers, washers, preparers, carders, overlookers, and buyers. Until recently, it was not known that woolsorters were more liable to have external anthrax than other persons. This form of the disease has also been met with in persons who have accidentally come into contact with infective material. A case has been reported of a boy having anthrax on the temple, from lying for a short time upon a bale of mohair; and another, of a gentleman having anthrax on the right temple, from touching some "Van" mohair with his right hand at the warehouse of a friend.

2. Alpaca and mohair are not the only infective materials. Many fatal cases have occurred from the manipulation of other dry and dusty hairs and wools. "Greasy" wools are less dangerous; it is probable that the "yolk" in them fixes the infective particles. All hairs and wools (excepting Algerian) may at times contain uncleansed fleeces from animals which have died from anthrax, and may occasionally communicate the disease to those who come in contact with them. I have seen such cases from the sorting of British wools, and have heard from my medical friends of others; but the proof is not yet complete.

3. The disease is not confined to this district; fatal cases have been reported at Leicester, Norwich, Glasgow, Constantinople, and in Massachusetts. I think it will yet be found in other places; and certainly in Peru and Asia Minor, and at the Cape.

Twelve months ago, employers and representatives of woolsorters met Her Majesty's Inspector of Factories, and represen-

tatives of the Sanitary Authority, at Bradford, to consider what precautions should be taken to minimise the evils of dealing with foreign hair and wool. Certain regulations were agreed upon. Particular kinds of hair and wool, which were generally believed to be the most dangerous, were to be steeped in water, washed, and otherwise dealt with, before they were sorted. This regulation has been generally acted upon. The result has been most gratifying. Excepting one case, I have not heard of any illness from sorting materials thus dealt with. If "sorted while still damp, as early as possible after washing," as was agreed upon, there will be no risk (some months ago I wrote); "but, if dried too much, I should be afraid of a case cropping up occasionally, because I know the infective germs are not all destroyed by washing in water at 100° to 120° Fahr." The cases I have now to report are of this kind.

Within three weeks, three men, who worked in the same room, have recently died from this disease. These cases deserve particular notice, as each case differs in some respect from those previously published.

*Case* 1.—*Anthracæmia.*—J. Gill, aged 72, a back-washer, had never been a day from work on account of illness, and had worked for the same firm over twenty-three years. On Saturday, May 14, 1881, he complained of feeling tired (indeed he had not been very well for several days), but continued his work till giving-up time, about noon. When he returned home, he went to bed, and slept most of the afternoon; during the evening he felt rather cold, had some cramp in the fingers, and noticed that some of them were bloodless and numb. He slept well through the night. On Sunday morning, he complained of a feeling of oppression across the chest, for which he took an emetic. His appetite was not good, but he took some meat and vegetables for dinner. I visited him at 11 o'clock p.m. He complained of nothing except some uneasiness, as if he "had something on his lungs." He did not appear ill, and said he did not feel to ail much, except that, when he raised himself in bed, he felt weak and weary. Pulse 82, soft and full; temperature 97.2°, axilla; respirations 24. No pain or cough; skin moist; tongue slightly coated.

On Monday, May 16, 10-30 a.m., he had passed a restless night, sleeping occasionally half an hour at a time. The uneasiness and weariness continued. He felt faint if he raised his head from the pillow. He had some thirst, but neither pain nor cough. The percussion-sound on both sides of the chest was clear; the vesicular murmur was on the right side inaudible, on the left side distinct. There were some bronchial sounds. Respirations 40; temperature in the axilla 93°, in the rectum 101°; pulse imperceptible. The extremities were cold; the

blood was stagnating. He died at 11 a.m., in my presence, forty-seven hours after leaving work.

I have attended many cases of this disease when the cough was slight; this is the first case I have known without cough.

I examined blood taken from the finger ten minutes before death, and failed to detect any bacilli. A small quantity, given to a mouse, produced death in thirty-six hours. Non-mobile bacilli were numerous in its spleen.

No *sectio cadaveris* was allowed. Forty-eight hours after death, I saw the body; it did not present the appearances of rapid discoloration and decomposition, which are sometimes seen within twenty-four hours after death from this disease. The left side of the chest did not yield fluid. I removed some from the right side by a hypodermic syringe for examination; it contained numerous long motionless bacilli.

I visited the mill where the deceased had worked, and was shown the various processes to which the wool was subjected before arriving at the machine which he tended. I was told, that, during the last six weeks, a lot of 250 bales of "Van" mohair, which was considered of good quality, had been used. When taken out of the bales, the hair was washed in soap-suds at 120° to 130° Fahr.; then passed through rollers; dried by hot air; sorted; washed, and dried again as before; passed through five preparing machines (or carded), then combed, before it arrived at the back-washing machine, where it passed through soap-suds at a temperature of about 100° Fahr. (at the time of my visit 130° Fahr.). The hair had been manipulated by more than a dozen workpeople before it reached the deceased. At each stage, its infective powers would be weakened. Those who handled it most, when it was most virulent, did not suffer. From this, and many other corroborative instances, it appears probable that the virus may gain access to the blood through some accidental abrasion of the mucous membrane. It is important to notice, also, that twice washing in soap-suds at 130° Fahr. is not sufficient to destroy or remove all the infective particles.

*Case* 2.—*External Anthrax.*—J. R. Baker, aged 58, machine woolcomber, on Monday, May 16, tended the back-washing machine at which the deceased J. Gill had worked on the previous Saturday. He had always enjoyed good health, was very temperate, and had worked for the same firm nine years. Soon after he commenced work, his left forearm was touched by one of the cog-wheels of the machine—a small portion of skin on the outer surface was nipped and torn; he thought nothing of it, but washed the blood and dirt off with a little wool, which he wet in the warm soap-suds through which the "Van" mohair was passing in his machine. Three days after-

wards (May 19), his forearm was swollen; he was surprised at this, as he "had excellent healing flesh," and went in the evening to consult Mr. Kenyon. On May 20, he discontinued work at noon; and I saw him immediately afterwards. He said he did not feel ill, but was afraid that he had got his arm poisoned. The forearm was swollen to the hand and the elbow, and pitted on pressure; the injured part was one and a half inches in length, of a crescentic form, and half an inch in breadth at its broadest part; it was not painful, and there was no redness of skin excepting at the edge of the wound. Blood taken from the margin did not appear to contain bacilli.

On May 21, I saw him at 10-30 a.m., with Dr. Rabagliati and Mr. Kenyon. He had passed a moderate night; slept well, had no pain or feeling of general illness; appetite good, tongue natural. The arm was swollen to its upper third; the swelling of the forearm was very hard, and did not pit on pressure. There was a raised vesicular rim along the margin of the skin around the wound. Pulse 72; temperature, left axilla 97.5°, rectum 101.2°. Serum from vesicles, examined at 2-30 p.m., contained a few bacilli. Two tubes of this, given to a rabbit, had no apparent effect.

May 22, 12-30 p.m. He had rested well through the night; his appetite was good; he had no feeling of illness, no pain, except of fulness from swelling of the back of the hand, which was very tense, and did not pit on pressure. The swelling extended to the shoulder; the upper third of the arm was not so hard as the lower part. Pulse 84; temperature in the left axilla 98.2°, in the rectum 100.7°. Serum from vesicles contained one bacillus in about a score of fields. A small quantity, given to a rabbit, produced no perceptible result.

May 23, 10-30 a.m. He had a good night, and felt well; he had no pain, except fulness from swelling of the hand. Soft swelling had advanced over the clavicle and pectoral muscles. His appetite was not so good; he was more inclined to drink. Tongue natural; no cough. Pulse 104; temperature in the left axilla 101.4°, in the rectum 105°. The circumference of the left forearm was $3\frac{3}{8}$ inches more than the right; of the arm, $4\frac{1}{2}$ inches more than the other. There was no redness of skin beyond the vesicular margin of the wound, the surface of which was covered with a dirty grey-coloured eschar. Serum from vesicles contained a few bacilli; half a drop, given to a rabbit, had no perceptible effect. 9 p.m. He had no pain or distress. The tongue was moist. He had taken food moderately. The swelling had extended over the scapula; as far as the middle, it was hard, terminating by a distinct ridge; beyond, it was softer. In front, the swelling had extended over the chest, and was not so hard as behind. Pulse 116, soft. After he had been

helped up in bed to the sitting position, and lay down again, the pulse was 130, and irregular. Temperature in the left axilla 99.8°, in the rectum 104.1°.; respiration 24.

May 24, 10-30 a.m. He passed a fairly good night; was not restless. He had no pain, but some uneasiness over the abdomen, which was relieved by vomiting. He appeared calm and composed. Pulse 130, very small, and difficult to count. Temperature in the left axilla 99.1°, in the right axilla 99.8°, in the rectum 102.3°; respiration 22. Serum from vesicles contained ten to twenty bacilli in each field. The contents of two tubes, given to a mouse, were fatal in seventeen and a half hours. 9-30 p.m. He had a restless day; passed no urine; his appetite was gone; his face shrunken. The swelling was extending; the extremities were cold; pulse imperceptible; temperature under the tongue 95°. He died ten hours afterwards. Serum from the arm contained bacilli; two tubes, given to a mouse forty-five hours afterwards, were fatal in sixty-five hours.

Post-mortem examination, made by Mr. Kenyon, nine hours after death. The ends of the fingers were of a dark colour. The upper surface of the scrotum had a dark-red colour. The swelling of the arm was much more yielding than during life. The injured part of the forearm was removed; the cut surfaces were crowded with small interstitial hemorrhages. There were no pleural effusions, nor enlargement of bronchial glands. The blood was fluid. There was no staining of the endocardium; no subserous petechial spots in the heart. All the viscera were apparently natural. Portions of the internal organs were sent to Professor Greenfield for examination. Serum from the arm contained numerous long motionless bacilli; after keeping two days in a capillary tube, the bacilli were very long and convoluted.—*British Medical Journal, June* 11, 1881, *p.* 915.

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## 9.—ON SEPTIC AND ASEPTIC PYÆMIA.

By Rushton Parker, Esq., M.B., F.R.C.S., Lecturer on Surgery, Medical School, Liverpool, and Assistant Surgeon to the Liverpool Royal Infirmary.

The putrid traumatic fevers which, when allowed to run a natural course, have a fatal termination in almost or probably in quite every instance, are now classed under the two designations pyæmia and septicæmia.

The germ theory of putrefactive fementation assigns to it a place side by side with the alcoholic and the acetic; and attributes the putrid transformation of a previously healthy animal fluid to the co-operative presence of a prolific crowd of bacteria or micrococci, just as the production of alcohol from a sugary solution is attributed to the presence and growth of the torula cerevisiæ or yeast, and as vinegar is made out of wine by the analogous agency of the mycoderma aceti.

The employment of germicides or antiseptic re-agents, such as have been experimentally proved to utterly kill the organisms appertaining to this variety of fermentation outside the body, while at the same time proving innocuous to the living tissues, or at most inflicting upon them a transitory irritation, has so extensively curtailed the number of cases which annually fall to one or other of these pestilential scourges, that the term preventible has been added to diseases of this character.

The successful attainment of rapid and total healing by the first intention of vast areas of lacerated tissue, without any disturbance of the patient's health or functions under conditions now called antiseptic, has not only secured to the antiseptic system the well-merited credit of having permitted babes to rush safely in where once giants properly feared to tread; but it has naturally led to the expression of very exclusive notions upon the subject of traumatic fever even in its simplest and least dangerous forms.

An early outcome of the antiseptic triumph was the prevalence of a notion that every form of wound-fever was an adventitious complication due to different degrees of chemical decomposition, and the more or less poisonous effects of the consequent foreign admixture with the circulating fluids; so much so that the uncomplicated course run now, as long ago, by many cases to which all precautions have been denied, has too often been totally overlooked in view of the enthusiastic confidence acquired by the successful employment of compulsory chemical antisepticism alone.

This is a fault less conspicuously noticeable in the experience and practice of men than in their expositions of opinion, which generally run in a grove more narrow than that traversed by their actions.

But it has none the less roused into flame, and often into fury, the spark of consistent and even complacent empiricism of those nurtured in an older school, that was no stranger to grand successes, and by no means devoid of intelligent rules whereby to operate and treat in similar cases.

In this way antagonisms have arisen and been maintained by the exponents of views that often appear and even claim to be mortally at variance, while being in reality both articles of a scientific surgical creed. All are agreed, in fact, though they may say it differently in words, that the amount of inflammation strictly essential for healing may be overstepped by three different agencies.

1. Undue movement of the injured tissues, to be directly counteracted or prevented by the artistic employment of rest.

2. Distension and mutual separation of the injured tissues—

to be directly counteracted or prevented by the skilled employment of drainage.

3. The superadded irritation of chemical ingredients of various kinds, of which putrid discharges are one—to be directly counteracted or prevented first by their absence; secondly, by their removal; or thirdly, by chemically neutralising them and rendering them inert. The knowledge of which extraneous ingredients are harmful altogether; and how to prevent the injurious operation of agencies which are themselves capable of proper use in destruction of others is an integral part of the antiseptic system, and need not be further detailed here.

It is only right to add that the perfect attainment of the first two objects, rest and drainage, is commonly enough to render the absence of the last but futile in its action; for, where there is no fluid accumulation, there can be no irritation from fluid decomposition, since not only is that fluid constantly escaping, but even a trace of decomposition is capable of being neutralised by the fluids themselves so long as they are fresh from the healthy vessels.

The resolute and skilful employment of either rest, drainage, or the antiseptic chemical state, alone and by itself is capable of achieving so much that we often see the total absence of necessary inflammation as the result of one precaution even in the face of neglect of the other two; but the combined effect of all three is positively irresistible; and so conspicuous are the immediate and remote effects of purely antiseptic chemical treatment alone, that they are not always prevented when rest and drainage are neglected, even in cases where these last are advisable.

Under these three heads are probably comprised the whole duty of the surgeon as regards purely local observations and treatment.

*The Question of Contagion.*—The older surgeons as well as ourselves were well accustomed to see this total immunity from constitutional disturbance, even though the cases were unprotected, except by their own unirritated lymph.

Not to pursue this part of the subject too far, I may at once say that a later development of the theory of traumatic fever is to this effect, that in its mild and uninjurious forms it may be divided into a septic and an aseptic fever. Here is a partial concession to the constitutionalists who see as much in nervous or digestive causes of digression as others see in possibly varying doses of an often imperceptible septic poison.

I am still in the safe regions of what is generally and roughly admitted, if not termed, simple traumatic fever; but I must plead for the name septic and aseptic traumatic fever, that it is the verbal expression of an important reality which is none

the less classified by the name, though that be not accurately descriptive. I have for three years made use of, and I think experienced, the advantage of this strictly practical name, which occurs in a paragraph in the British Medical Journal for 1877, quoted from Volkmann and another; and I fully accept the phrase, though for slightly different reasons.

I have only to mention it to secure your admission of the fact, that cases in which we can detect no single local flaw, occasionally present one or more of the symptoms always present in traumatic fever; that is, rest, drainage, and a chemically aseptic state, are all in perfect evidence, and yet an elevated temperature, with even an occasional rigor, may now and then disturb the otherwise peaceful and perfect record. Of course, a little suppuration, due to movement or slightly defective drainage, may exist with a perfectly aseptic condition of discharge which is confessedly exaggerated; and then an elevated temperature, though not invariable, may be sufficiently accounted for.

But in the absence of all local imperfection, and in a state of reparation which is economically perfect, one is sometimes met with constitutional disturbances of a kind that may be disquieting to the surgeon, though unnoticed by the patient.

I cannot but attribute to a series of nervous conditions some of these constitutional phenomena which I would include under aseptic fever. It is at any rate highly probable that we must look outside septic irritation for some of the phenomena rightly classed under the useful head traumatic fever.

Quite apart from the traumatic state, or the existence of spontaneous inflammation, the system may be upset through the agency of the nervous system, by fear, fatigue, or biliousness, whether the result of constipation, improper feeding, or of an anæsthetic. In analysing the symptoms of illness in a surgical case, I do not see how to estimate their relative importance, in the entire absence of this admission; and I accordingly feel that it is incumbent upon the surgeon to try, whenever it is possible, to eliminate these possible sources of constitutional error, so that when treating a traumatic or other inflammation, his observations and his directions may be as unhampered by uncertain appearances as in him lies to secure.

It is none the less true that a well-executed antiseptic operation and after treatment may be calculated, in the absence of constitutional preparation, to leave practically unimpaired the health of most patients concerned. But I wish to deny that every slight stage of so-called traumatic fever is due to septic influences alone, or even to other local errors in a wound or healing inflammation that may still be free from all trace of putridity.

Perhaps it is not incorrect to define hectic as a wound-fever due to temporary putrid retention, which may disappear on setting free the fluid that caused it. It may none the less prove fatal if too frequently permitted to recur, or too long allowed to exist.

Similarly septicæmia may be defined as a fatal dose of hectic; in this sense hectic being a temporary and not necessarily fatal attack of septicæmia.

Septicæmia then is a blood-poisoning due to the absorption of putrid materials into the blood. It may kill by direct intoxication due to the poisonous action of the chemical liquid resulting from the putrefactive fermentation; or it may be an actually infective phenomenon, and may represent the admission of the organisms which have set up this transformation, and which themselves multiply in the blood, and keep up the process by transforming the very circulating fluid. In this case the bacteria or micrococci will be found in blood drawn from such a septicæmic patient, and such blood will be capable in sufficient quantity of setting up a similar process by inoculation into the body of another individual; whereas the blood of a person suffering from septic intoxication, is incapable of infecting another in any way, though the owner of the blood may be mortally poisoned. It is thus quite possible that what we denominate hectic in its curable form, may be the milder degree of septic intoxication, and its lethal form the fatal variety of similar intoxication.

But these are refinements of pathological, if not yet of universal clinical interest, though ably considered in the Report of the Committee of the London Pathological Society presented last session.

The symptoms though uncertain, are too apparent—rigors, profuse sweats, elevations, and depressions of temperature, cessation of nutrition, rapid and excessive prostration, a living death masked by respiration and circulation for a time. But after death no special signs outside the wound.

This last is usually bathed in a putrid mass: there are ecchymoses on the serous membranes, and generally a pulpy spleen, softened liver, and friable kidneys; but none of these appearances are pathognomonic, and may be found in other acute specific fevers.

But there yet remains pyæmia, which in its most typical form is septicæmia locally and constitutionally, with the anatomical addition of a series of changes that are no less interesting than too often puzzling, and perhaps not yet too amply comprehended.

When the symptoms of septicæmia are supplemented by putrid clotting and disintegration of blood in the veins near the

infected wound, and by dissemination in the lungs of putrid embolic abscesses derived from the disintegrated venous clots, we have the typical and most frequent forms of pyæmia. The liver, spleen, or kidneys may be each, with or without the lungs, the seat of similar putrid abscesses, the embolic nature of which needs no defence to-night, as it has been abundantly demonstrated. More rarely the heart, and other viscera or organs may be similarly infected.

The symptoms in these typical cases may, in addition to those of septicæmia refer to the organs secondarily infected; they may be pneumonia, pleurisy, jaundice, albuminuria, and what not, —or they may not; in any case no one can deny that the exact differential diagnosis of septicæmia and pyæmia may be often only at best suspected or guessed at, may be as easily one as the other, and as easily wrong, for reasons to follow.

Of the complication of suppurating joints, and occasional subcutaneous abscesses, I must further make mention, as they are not constant phenomena, and are capable of occurrence in the absence of either pyæmia or septicæmia.

But it is equally certain, and not disputed, that secondary embolic putrid abscesses may occur without visible or discoverable thrombosis in the veins of the putrid source, leaving us to believe that such thrombi have existed nevertheless, though of microscopic dimensions.

The blood-poisoning is there, and in many such cases, micrococci have been seen in blood drawn during life, and in the same fluid, and in the secondary infarcts after death.

The old name is still retained, though not in the exact sense in which it was first adopted; but like many other old names, though ceasing to be adequately descriptive, it serves an excellent purpose if only to group together analogous pathological states that may differ in even important details.

But while the putrid form of pyæmia and the other condition septicæmia are in their main features recognisable, if not always during life capable of mutual contrast, we are met by analogous infective processes and fatal phenomena, of a totally aseptic character.

*First*, the cases of ulcerative endocarditis in which emboli may lodge, not only in their favourite artery, the middle cerebral and its branches, but in any artery, and further in terminal twigs of vessels in the lungs and other viscera, including the kidneys and spleen, producing a state of embolic infarction, characterised by inflammation, and that too even of a suppurative kind.

These cases have been called pyæmic endocarditis, the source of infection being the valves of the heart, or the commencement of its issuing arteries, and the infective transported material

being probably often in an acute state of inflammatory life, if not growth, and capable of setting up in the part where they lodge an inflammation of greater or less intensity, possibly after the manner in which a lymphatic bubomay be supposed to arise secondary to some other primary source. In rare cases, an artery of a limb is thought to be perforated, and become the seat of diffuse aneurism, even in young persons, of which condition I showed an apparent example here last session.

Then come those rarer but well-authenticated instances of embolic suppuration, secondary to acute periostitis or ostitis, also suppurative, but uncontaminated with any septic particles, and free from any possibility of aerial infection by septic germs. To this class my case of this evening appears to belong. Such cases are not common, but quite numerous enough to place outside all dispute the fact that embolic abscesses and suppurative thrombi may co-exist and lead to death, in the absence of putridity set up from without.

However rapidly or certainly fatal these cases may be, they are in no way characterised by the clinical phenomena of septicæmia which complicate the putrid pyæmias. The patients die of the local organic disease, either alone, or followed by general constitutional malnutrition, as in a case of so-called asthenic pneumonia.

They are of infinite importance in two ways, for they appear to throw light upon those cases of chronic pyæmia in which the putrid evidences are either very slight or but slightly recognisable; and they appear themselves to be explicable in comparison with all cases of secondary malignant visceral disease, in which the infection is clearly embolic on the one hand, and devoid of putridity on the other.

I say nothing of cases in which pyæmia has been suspected merely upon insufficient pathological and clinical evidence; but I should not be at all surprised if the numerous cases of comparatively mild, and the suspected instances of cured pyæmia, should at some future time be definitely relegated to the domain of either suppurative non-putrid embolisms pure and simple, or of cases in which thrombosis and their secondary embolisms though originally putrid, may have had this character partly or wholly neutralised by contact with healthy fluids, or at least of the blood in distant parts of the body, the antiseptic qualities of which fluids, and especially of the blood within certain limits, have been already demonstrated by Professor Lister.

I have drifted into a more lengthy view of this subject than that which I had imagined I saw before me, and I have treated most curtly the subdivision of traumatic fevers selected for this evening's consideration. But I have found it indispens-

able to the exclusive criticism of pyæmia, to pass in review the allied diseases from which I must exclude it. I have presented to you the subject in the form in which it serves itself up to me for my own teaching, though I have hardly expressed a single view that is not shared by a fair number of modern pathologists and practical surgeons; while the decided majority of the opinions here but too imperfectly hinted at are probably held by most gentlemen present, and are almost certainly but an average statement of prevailing doctrine.

I rely mainly on the hope that the general impressions I have now conveyed are but a reciprocation of impressions that have occurred to many present minds, derived as they are from common facts, the most important of which are too frequently the subject of our common attention.—*Liverpool Medico-Chirurgical Journal, July* 1881, *p.* 73.

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## 10.—ON ANÆMIA AND FATTY DEGENERATION.

By Sidney Coupland, M.D., F.R.C.P., Physician to the Middlesex Hospital.

The frequency with which fatty metamorphosis of the tissues and an anæmic state of the blood are associated is such that the connection between the two must be an intimate one. Whenever a tissue is deprived of nutriment, it undergoes this change, its albuminous particles becoming converted into fatty granules and oil-globules. It is the simplest instance of retrograde metamorphosis of the tissues, and occurs as a physiological event in their natural decay. Pathologically, although no tissue is exempt from this form of degeneration, the muscles are particularly prone to it, and this proneness is no doubt due to the muscles being so actively employed in the metabolic processes of the body. Deprived of their due supply of oxygen, their protoplasmic elements are unable to go through their normal changes; and, instead of complex stable products, they break up into fatty molecules. Such a conversion may be effected with remarkable rapidity: witness the wide-spread metamorphosis in acute poisoning by phosphorus, which may be established within a day or two; and in such case I believe the change is effected by the deprivation of oxygen, and the disturbance to the normal tissue metamorphosis thereby established. More often, there is reason to believe that the process is of slower duration; but, important as it is to determine this question, I do not think it possible to do so yet. There may be links still wanting in the chain of knowledge; but it is, to my mind, one of the most reasonable facts in pathology, that, whenever the blood is impoverished, the tissues must suffer degeneration, and it is important not to disregard the fact in the

treatment of anæmia. The muscle of the heart—which of all muscles requires a constant and definite supply of oxygen for its renewal, its unceasing action denoting continual metamorphosis—is particularly liable to suffer. Nourished probably in two ways, by the blood circulating through its cavities and by the arterial supply to its walls, is there not reason enough why this muscular organ should be especially singled out to undergo this metamorphosis when the blood is deficient in oxygen-bearing elements? Hence it is said that the occurrence of true fatty degeneration of the heart is recognised as the most constant and most striking effect of a grave and prolonged anæmia. Out of seventy-six cases of fatal idiopathic anæmia, where post-mortem examinations were made, in sixty-four it is expressly stated that the heart was thus degenerate, sometimes extremely so; in six other cases, no mention is made of its condition; and in only six is it said to have been healthy. This degeneration of the heart is, in fact, as I pointed out in my last lecture, the only constant anatomical feature of cases of idiopathic pernicious anæmia. It was originally pointed out by Addison, and the observation was abundantly confirmed by Wilks; and its occurrence has been noted, as above seen, with few exceptions, in every case of fatal anæmia since attention was drawn to it. Wagner, in his treatise on Fatty Degeneration of the Heart, attributes some cases to anæmia, and Ponfick described in detail the "anæmic form" of fatty heart. There is, then, general concurrence of opinion upon the association; and it is probable that it has wider bearings than we generally admit. The recognition of this sequence, as a pathological fact, may possibly, in time, throw light upon cases of cardiac degeneration at present thought to be idiopathic—cases, that is, which do not arise secondarily to inflammation of the pericardium and myocardium, from disease of the coronary arteries, from alcoholism or from fever, or, as a final event, in long-standing valvular disease. It is hardly conceivable that an impoverished state of blood should follow upon an enfeebled fatty heart; at any rate, such an impoverishment as to fall under the head of anæmia. It is far more probable that the degeneration is the result of the blood change rather than the cause of it. There are many cases where the degenerative powers have been apparently of rapid evolution—cases of acute anæmia following loss of blood. As an example of this, I might instance the case related in my last lecture (No. 6), where profuse and uncontrollable uterine hemorrhage supervened in a chlorotic subject, and where the heart was found to be most extensively degenerated. Here is another case, where one factor, at least, in the production of the degeneration was a similar loss of blood. A woman, aged 46, was admitted under

my care into the Middlesex Hospital, on Oct. 23, 1880, suffering from general dropsy dependent upon a dilated and degenerate heart. She had approached the climacteric, having previously passed a healthy life; but, for the past five years, the catamenia had been most profuse; she called it "flooding." Three months before admission, the menses apparently ceased; to reappear in great excess during the past fortnight. Œdema of the legs began about one month before, followed by swelling of the belly; but, prior to this, she had been getting pale, and suffering from palpitation and breathlessness on exertion. She was somewhat obese, very anæmic, and the conjunctivæ were yellow-tinged. Accounting for the dropsy, there was evident dilatation of the heart, with epigastric impulse, a soft systolic apex *bruit*, and irregular intermittent pulsation. She suffered from œdema of the lungs; and treatment had no effect in reducing the dropsy or removing the anæmia, which even grew more intense, although no menorrhagia occurred whilst she was in the hospital. After her death, which took place on Nov. 12, the heart was not only overladen with fat, but its muscular walls were flabby and extremely degenerate. The kidneys were also fattily degenerated. Here, then, was a case (and it is one of a class) where the cardiac degeneration was the most pronounced feature, and was the immediate cause of death, but where it seemed probably related to, if not wholly dependent upon, the menorrhagic attacks to which she had been subject. Dr. Green has recorded a striking instance of the effect of profuse menstrual loss in inducing fatty degeneration, in the eighth volume of the Clinical Society's Transactions. The case is that of an anæmic ill-nourished girl, the subject of mitral stenosis. The occurrence of menstruation, after an interval of six weeks, and the profuseness of the flux (possibly made so profuse by the presence of the mitral disease), so lowered the standard of the blood, that, within five days, she died in a state of exhaustion. In addition to the mitral disease and an abnormally narrow aorta, the muscular tissue of the heart was found to be in an advanced state of metamorphosis, and similar regressive changes were met with in some of the voluntary muscles. Similar examples might be quoted. The degeneration of voluntary muscles observed in Dr. Green's case is very interesting; and it is probable that, if such muscles were more frequently examined in anæmia, they would be found occasionally affected.

One may, without transgressing the rightful limits of pathological speculation, attribute the origin of the areas of fatty degeneration observed by Virchow in the lining membrane of the aorta in cases of chlorosis to the same cause—the impoverishment of the blood. The well-known experiments of Cohnheim bearing upon the embolic process demonstrated the fact that

the integrity of the walls of the blood-vessels depends upon their being filled with a due amount of healthy blood, The tendency to capillary hemorrhages—purpuric spots, ecchymoses beneath serous membranes, and sometimes parenchymatous hemorrhages—in pernicious anæmia is, I believe, due in great measure to such vascular deterioration. It has not always been found, however, in such cases; but I may say that the only opportunity of which I availed myself of examining the retinal vessels in a case of this disease, where there were marked hemorrhagic foci in the retina, enabled me to distinguish clearly that the endothelial cells of the small arteries, and those of the capillary walls themselves, were studded with minute oil-globules. That such ecchymoses are due to the condition of the blood only is far less probable than that they are caused by actual damage to the vessel-walls through which the altered blood circulates; and, when there is evidence of such vascular deterioration, this explanation seems to be all-sufficient. This, however, like that of the condition of the voluntary muscles, is a point which calls for further investigation.

Fatty degenerations of the gastric and intestinal glands, of the liver, and of the kidneys, are met with in a certain number of cases of profound and fatal anæmia; but how far, and in what way, whether as results or as causes of the anæmia, it does not seem possible yet to say. Certainly, not one of these organs may be so affected; they are not so often found degenerate as the heart-muscle. The gastric glands are not often examined, and their derangement is possibly a factor in the production of the anæmia; whilst the intestinal and hepatic cells are liable to undergo a physiological fatty infiltration, which must not be confounded with a morbid state. In one of the cases previously related (Case 5), the liver, though certainly fatty, was very remarkable, the cells affected being those nearest to the centre of the lobule, and not at the periphery, as in the ordinary fatty infiltration-process. Some of the most advanced cases of visceral fatty degeneration which I have seen have occurred in cancerous subjects, especially uterine cancer, which more or less rapidly progresses in ulceration, impoverishing the blood more and more as it advances. Such instances of course differ from cases of phthisis, where there is pyrexia and direct respiratory disorder to aid in the production of the fatty change.

I am not, however, now concerned with the subject of fatty degeneration as a whole, but only in relation to anæmia. We have, I think, ample evidence that there is a link between the blood-condition and the tissue-change; and everything points to the latter being the result of the former. At the same time, we must not lose sight of the other alternative to which I have above alluded, for I do not think it is absolutely capable of

disproof, at any rate in every case. I refer to the view that the anæmic condition is itself dependent upon what may be called an "inertia" on the part of the tissues, whereby they do not perform what is required of them, and, failing to go through their normal metamorphosis, pass into the fatty regressive state. In such a case, there would be less demand for oxygen, and this would react upon the supply, and fewer corpuscles and hæmoglobin would be formed. Such an hypothesis requires, however, far more than the former, which has also received support from experimentation, a continued loss of blood being found to produce fatty metamorphosis.

The *treatment of anæmia*, apart from the removal of its cause, when this can be ascertained, may be summed up under the head of hygienic, dietetic, and medicinal measures. On the first and second of these, I need hardly dwell; their importance is self-evident. The necessity for rest, alternated with moderate exercise, graduated according to the severity of the anæmia, is important. Even slight exercise is irksome and harmful until the blood is sufficiently reinforced to permit of it; and absolute rest is called for at first. The influence of air and light is of as much value in aiding restoration from the anæmic condition as their deprivation is powerful in inducing this state; and such hygienic measures as bathing act by promoting tissue-metabolism. A valuable contribution to the treatment of anæmia by these means has lately been made by Drs. M. P. Jacobi and White (Archives of Medicine, August and October 1880), in what is a scientific exposition of the effects produced by those who practise hydrotherapy. These writers relate cases, accompanied by analyses of the urine, where wet packs and massage were employed, in addition to ferruginous medication. The effect of such treatment was to cause increased elimination of urea, to improve appetite, and to procure sleep; and the explanation afforded is, that the treatment, acting through the nervous system and the circulation, promoted tissue-change, and increased the capacity of the tissues and the blood for oxygen, the passive exercise of the muscles aiding also, by quickening the circulation, in the removal of the products of nitrogenous waste.

In diet, the indication is to allow meat in considerable quantity as soon as the digestive organs are capable of the work imposed on them; but where, as so often happens, the digestive power is at a minimum, then recourse may be had to meat-essences, peptonised foods, and (as an extreme measure) nutrient enemata. There is frequently a great distaste for nitrogenous food among these subjects, many of whom owe their anæmia in large measure to their preference for a diet of non-nitrogenous materials; and it follows, therefore, that chief attention should

be paid to this point, especially as the organs of digestion are more or less deranged by the anæmic state. As I have before pointed out, digestive derangements both induce and are induced by anæmia; and, by dealing with them, we often strike at the root of the condition, which, however, requires also measures directed specially to it. These measures comprise the administration of certain drugs, which are comprised under the term "hæmatinic." Of these I pass now to speak briefly.

Of all remedies, iron maintains, as it always has maintained, a pre-eminence in the treatment of anæmia. It seems to act directly upon the blood-forming viscera, and probably also upon the digestive organs—*i. e.*, on the gastro-intestinal tract. No wholly satisfactory explanation has, I believe, been given of the mode of action of the iron in either of these directions, or of the reason why the best results in the most marked cases of chlorosis are obtained by the administration of heroic doses far in excess of what is actually required in blood-formation, and much more also than is actually absorbed. Trousseau called iron as much a specific in chlorosis as mercury was in syphilis; and there was truth in the remark, although we may not know in what its specific action precisely consists. The application of methods of blood-measurement enable us to estimate the rapidity with which iron hastens recovery from the anæmic condition. Sometimes it appears to act, at any rate in the first instance, by causing an increase in the number of corpuscles without a corresponding increase in the amount of hæmoglobin.

Next to iron, and in some forms of anæmia to be preferred to it, is arsenic. This metal is a powerful hæmatinic. It acts on the tissues as well as on the blood and blood-forming organs; and its effect upon the cutaneous epithelium has been actually demonstrated. It is almost the only drug which has been successful in the treatment of severe idiopathic anæmia, which more often resists all medication. The patient under Dr. Cayley's care, where the anæmia was most profound and the corpuscles had fallen to a little less than one-half the normal, notably improved under arseniate of iron. A case was recently recorded from St. Mary's Hospital, under the care of Dr. Broadbent (British Medical Journal, September 25, 1880, p. 508), which is a good illustration of the efficacy of arsenic. A woman, aged 42, who had been progressively anæmic for about four months, and was in an extreme condition when admitted (estimated number of corpuscles two days later being 560,000 per cubic millimetre, or 11.2 per cent.), was placed upon liquor arsenicalis with digitalis. The dose of the liquor was increased from two to four minims, and was administered six times daily. In two months' time the number of corpuscles had increased to

64 per cent. In the remarks appended to the report of the case, it is held "that there can be little doubt that it was of essential or pernicious anæmia; the patient had the appearance characteristic of this disease, and the subfebrile temperature; while the red corpuscles of the blood were not only reduced in number to an unusual degree, but deformed. Whether this diagnosis be accepted or not, the failure of iron to do good, and the rapid improvement during the administration of arsenic, are remarkable. In little more than two months the patient passed from extreme anæmia to apparently perfect health, with wonderfully good colour of the cheeks and mucous membranes, and she continued well and strong for some months after leaving the hospital, up to the time when she ceased to present herself for examination." Such cases as this speak strongly in favour of the value of arsenic. I have sometimes prescribed it in simple anæmia (see Table, Nos. 5 and 6) with good result, but as a rule one prefers the use of iron, which acts more promptly and fully. Phosphorus has been sometimes administered with success in essential anæmia; as, for example, by Dr. Broadbent in a case where iron had failed; but it has, on the whole, but few, if any, advantages over arsenic, and its long continued administration is to be deprecated.—*Brit. Med. Jour.*, *April* 23, 1881, *p.* 633.

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## 11.—A STUDY OF THE PERIODS OF INCUBATION OF THE COMMUNICABLE DISEASES.

By Benjamin Ward Richardson, M.D., F.R.C.P., F.R.S.

The points I propose for discussion are the following:—

1. The precise application of the term incubation, and to what diseases it should be applied?

2. The amount of absolute knowledge of the period of incubation of the more common communicable diseases?

3. The differences of opinion on this subject; do they depend on fault of observation, or on the circumstance that there are, in the same diseases, varying periods of incubation, the variations being under no, as yet, defined rule?

4. If it be seen that there are differences of periods in the same diseases, upon what may such differences depend?

5. The practical lessons which arise from the facts we at present possess, and the extent to which our knowledge may be rendered available in regard to direction in the prevention and treatment of disease?

The period in the course of a disease to which we should apply the term incubation, and the diseases to which we should strictly apply the term, are the two first points deserving our consideration.

At the outset this may seem to be a subject easy enough to settle, but when the mind comes down to it, it is not at all easy. We simplify somewhat by saying that the term is to be limited to those instances in which, after a certain specific poisonous particle has been taken into a living body, certain indications of the action of that specific poisonous matter has been manifested. We say that the period between the introduction of the poisonous particle, and the appearance of manifestation of action, is the period of incubation, but we fail to be unanimous on the question—What is the accepted first sign of such manifestation? Is that first sign any sign, or one particular sign? Is it a local sign, or is it a general or systemic sign? If, again, if it be a systemic sign, is it one systemic sign, or two, or more, or one of many?

Let me give a small illustration of what I mean. The older practitioners, when they inoculated for small-pox, ruled that the orange-coloured eruption round the needle-puncture came on from the fourth to the fifth day, followed by a distinct vesicular rising, with pain in the axilla, on the seventh day, and systemic pain—pain in the back and limbs, and head—with rigor and fever on the ninth or tenth day, and appearance of a general eruption on the eleventh day. What here was the period of incubation? Was it from the time of the insertion to the occurrence of pain in the axilla, or to the rigor with pain in the back and the limbs, or to the appearance of the general eruption? In vaccinia, in these days, we meet with this question—Is the appearance of the local eruption at the point of puncture, and the formation of the vesicle, to be counted as the end of the period of incubation; or is the after fever, or other systemic symptom, to be taken as the close of the period? I have known a case of vaccinia in which there has been no indication of effect at all, except the local manifestation. In such a case am I to say that the local change is sufficient when it is vesicular, when it is pustular, when it is maturative? Or am I, in such a case, to say there has been no period of incubation at all; that the whole process is abortive, and that the vaccinated is therefore either insusceptible or unprotected? I take this illustration because it is so very definite, because we know that the poisonous particle was inserted at a certain time, and can therefore be traced from that time into effect. When we come to the question of reception of the poison by a means less definite, we have more reason than ever for some decided rule. In scarlet fever what shall guide us? Shall it be the actual fact of a change in temperature? If so, shall that be the preliminary depression of temperature? Or, shall it be the first elevation of temperature that follows depression? Or, shall it be pain, or shall it be eruption?

Until we can agree on these points, there can never be accuracy in our records.

I have studied very closely for two years past the various sides which this question presents, and by exclusion I have, for the moment, come to an opinion I am about with submission to offer to you. I would exclude all mere local manifestations, because I see that they may be presented and may not indicate that the disease has been incubated, in the full sense of that term. I exclude pain, local or general, because that might be due to other causes than the action of the poisonous material, or if it were due to that it is too much of a subjective symptom to be reliable. I exclude eruption because it may not be present, although the disease may be incubated, or it may be looked over, or it may be transient and therefore not detected. I exclude mere rise of temperature because that alone might not be detected at its origin, but might have been long present before it was detected. But I accept as the safest of all the phenomena indicating that the period of incubation is declared, that sudden vibration between cold and heat which we call chill or rigor. This is at once a subjective and an objective phenomenon. The observer sees it in the pallor and coldness and shivering, and reactive fever of the affected. The subject of the attack is easily able to define its precise period of commencement and its course. Moreover, of all the phenomena it is the most certain. In my experience I never knew a case of a communicable disease that was not preceded by chill. In cholera, in which it might perhaps not be expected by those who have not seen the disease, according to my experience in the two epidemics I have witnessed, it was always present. "The chill came on," at such a time was nearly the invariable sentence which fell from the lips of the stricken who were able to describe their own sufferings. There is, moreover, a physiological reason for accepting chill or rigor as the indication that the poisonous particle has taken effect. The phenomenon is the natural indication that the disunion of normal action between the nervous and the vascular systems has taken place. It is like to the convulsive tremor which occurs when at a precise point during loss of blood the break between blood supply and nervous supply is interrupted. It is still more like the tremor which is invariably produced when an alkaloidal poison like nicotine shows its diffusion through the body, and, as we would say, declares that the period of its introduction is finished. If we had an alkaloid like nicotine which would increase in the body and by its increase diffuse up to the pitch of physiological action, we should rule that the incubation was finished when the tremor declared it. Granted then, that a disease runs a definable

course, I should take the first rigor or chill as the first sign of the disease, and should accept the intervening period between the introduction of the cause and the development of the chill, as the true period of incubation.

In the next place we may study under the present head the diseases to which the term period of incubation may be properly applied. On this point there is nothing strictly definite amongst the members of the profession. We are probably pretty unanimous in assuming a stage of incubation to the following common affections, twenty-five in number:—

1. Plague.
2. Cholera.
3. Malignant pustule.
4. Scarlet fever.
5. Diphtheria and croup.
6. Influenza.
7. Pertussis.
8. Glanders.
9. Erysipelas.
10. Farcy.
11. Grease.
12. Dengue.
13. Gonorrhœa.
14. Relapsing fever.
15. Variola.
16. Vaccinia.
17. Varicella.
18. Measles.
19. Rotheln.
20. Typhus.
21. Typhoid.
22. Mumps.
23. Malarial fever.
24. Syphilis.
25. Hydrophobia.

But there are some others on which we should not be so unanimous, as for instance—

Catarrh.
Puerperal fever.
Pyæmia.
Hospital gangrene.
Sloughing phagedæna.
Phagedæna.
Remittent fever.
Intermittent fever.
Choleraic diarrhœa.
Cerebro-spinal fever.
Carbuncle.

These last-named diseases all require to be more carefully observed in respect to period of incubation and first indication of defined symptoms before they can be proved to have a stage of incubation at all, and before, therefore, our knowledge can be said to be perfect in respect to them.

I would now venture to indicate what are the nearest approaches to the true periods of incubation in the different diseases which present an undoubted stage of incubation. In preparing the chapters of a work on preventive medicine, I thought it worth the trouble to collate the views of all our best authorities on the subject, old and modern, and to bring them into a condensed form, adding thereto what I had myself observed from natural facts.

Without loss of time I will state the results in brief form, but I must not let the opportunity pass of expressing how deeply we are indebted to Dr. Squire for the insight he has shown in dividing the communicable diseases according to their periods of incubation. Following closely his admirable plan, but somewhat extending it, I divide the diseases attended with stages of incubation into five groups:—

*Shortest.*—(*a*) Shortest Stage of Incubation—1 to 4 days.—Malignant cholera. Malignant pustule. Plague. Catarrh. Dissection wound diseases.

*Short.*—(*b*) Second Short Period—2 to 6 days.—Scarlet fever. Rosalia idiopathica. Diphtheria. Dengue. Erysipelas. Yellow fever. Pyæmia. Influenza. Pertussis. Glanders. Farcy. Grease. Croup. Puerperal fever.

*Medium.*—(*c*) Medium Periods—5 to 8 days.—Relapsing fever. Gonorrhœa. Vaccinia. Inoculated variola.

*Long.*—(*d*) Long Periods—10 to 15 days.—Small-pox. Varicella. Measles. Rotheln. Typhus. Typhoid. Mumps. Malarial fever.

*Longest.*—(*e*) Longest Period—40 days or more.—Syphilis. Hydrophobia.

If we may accept these as the common expression of knowledge up to the present time we have still much to learn. We exclude several diseases altogether which probably have some stage of incubation, and we are obliged to grant exceptions in respect to those that admit of being more readily classed together.

The diseases of the first group are fairly steady in respect to incubation, but it may by some be raised as a question whether catarrh, either superficial or cellular, should be classed amongst the communicable diseases at all. On this point I am very interested to hear the opinion of this Society. That catarrh may be excited without communication I know, and it may be that it is always due to a general influence.

Of the diseases of the second or third group, exceptions may be adduced in which the disease may have a shorter incubation, in particular cases, than is assigned in the classification. Such exceptions must be admitted, and my own case of Scarlet fever, quoted by Murchison, shows for this disease, occasionally, a very brief incubation,—six hours at longest.

Others may question whether Rosalia idiopathica has a period of incubation at all, and whether it is not more closely allied to those affections attended with rash, which, like urticaria, are induced by improper food, than to Scarlet fever. I attended once, with Murchison, a case that terminated fatally from occurrence of bullæ in the glottis,—coming on during convalescence,—in which we never determined whether the affection,

which commenced like an attack of acute urticaria, was roseolous or not. The eruption became like that of scarlet fever, with large white blotches over the surface, and in all respects yielded the form of disease which Mason Good designated rosalia parithmitica.

I would prefer, for my part, to classify these as doubtful cases, and at the same time leave them open for further study.

The diseases of the third and fourth groups will be accepted as fairly steady. Relapsing fever, as I knew it in 1847, had a longer period than five days of incubation, but by inoculation it is said to have five days.

In the last group syphilis will be accepted as having the long incubation of forty days. But hydrophobia is the most difficult disease to define. It may have a few days of incubation only. It may have months or even years.

These considerations lead up to the third question with which I opened this paper in respect to differences of opinion on periods of incubation. Do these differences depend on fault of observation, or on the circumstance that there are, in the same diseases, varying periods of incubation, the variations being under no defined rule?

My answer to this question is, that the differences of opinion so often professionally expressed, and which strike the general public with such wonder, are due rather to want of uniformity of observation than to variation of natural phenomena.

This I trace to four sets of causes—

1. That we have never yet agreed altogether as to the first sign that indicates the close of incubation.

2. That until quite lately we have not ventured to classify, so that there has been no clear grouping of diseases by the test of incubation.

3. That we have been accustomed to consider exceptional phenomena of incubation as more common and important than they really are.

4. That we have been too much accustomed to connect diseases which are most dissimilar in actual fact too closely because of certain similarities which do not really affect the question when all the facts are known.

Now that we are coming nearer to the truth we may hope to classify the exceptions, the nature of which is included under the next heading of my paper. Upon what circumstances do the exceptional periods of incubation of the communicable diseases occur, and why do they occur?

We may assume that a difference in physical property is the reason of the difference of action of the distinct poison of the defined communicable diseases. But when we are dealing with a single poison,—with the poison of scarlet fever, for instance,—the

difficulty commences. We can scarcely conceive that the poison changes in character and operation; and we are, therefore, obliged to trace out its effects through the means by which it comes into operation.

In studying this difficulty we light at once upon one useful fact. We know, of a certainty, that a poison which will affect, both by inoculation and by absorption through the lungs or alimentary surface, acts according to circumstances of introduction in distinctly different periods. In the case of small-pox, it acts one-fifth more quickly when it is inoculated than when it is absorbed through membrane. There would, therefore, probably in every case of absorption, be a difference in favour of rapidity of action, if the poison should be distributed over an injured or abraded surface, so as to inoculate such a surface in transit.

It is fair again to assume that the poison may be inhaled in a form of diffusion more ready for absorption in some cases than in others. But the great cause of difference is, I suspect, in individual susceptibility to the action of the poison, and it may be to the different influence of the same poison under different times and conditions of life. With this part of our study we have to unravel all the questions connected with the course of the communicable diseases in relation to seasons. That we should be more susceptible to the action of the poisons of the spreading diseases at those seasons of the year when there is excessive waste of bodily structure, and that we should be less susceptible to them in genial seasons when there is a balance in favour of nutrition is not a strange physiological pathological phenomenon. That we are more susceptible at the one period and less so at the other is, I suspect, more than a mere coincidence.

Here, however, I came to a point in theory which must be reserved for experimental development and exposition.

I turn now lastly, and briefly, to the practical sides of the subject in hand, and these are many. I will allude to three.

If we could arrive at definite evidence on which we could all rest, that the incubation of a disease is produced by the occurrence of a certain indication, we could account for much that seems now to be mysterious. For example, in vaccinia can it be that, trusting entirely to the local phenomena, we sometimes have an apparently good vaccination in which the disease never has incubated at all? If that be so, there is a reason why the person who seems to have been thoroughly vaccinated, should still remain susceptible to small-pox. The suggestion, though it stands alone, is all sufficient to indicate the practical importance of delivering incubation before pronouncing as to the protection afforded by some, but not all, the symptoms of a communicable affection.

The division of diseases of the communicable type into different classes or groups, according to the stage of incubation presented is, I think, a practical acquirement of the most important every day value, both in curative and preventive science. Dr. Squire has not in the least degree over estimated this part of modern knowledge. It is quite true, as he shows, that to know when to retain at home a sick person labouring under communicable disease, when to send him from home, and when to separate him from the actual or presumably unaffected, is a direction of practical skill as eminently creditable to the profession of medicine as it is useful to the public. To remove the healthy from the affected is good practice in the case of all the diseases of the first and second of the groups I have given, *i.e.*, of the quick and short incubation series. To remove in the third series may be sound practice. To remove in the fourth, or long incubation class, is less important, and may be a practice that is quite at fault and prejudicial.

Lastly, from the study of the incubation period we learn how to assign the best means of disposing of the affected during convalescence. It seems to be a true reading of natural phenomena that the diseases of short incubation have a prolonged convalescence, and remain long as sources of communication ; while the diseases which show a long incubation give a quicker convalescence, and a more rapid freedom from danger as sources of communication. Here, then, is a practical lesson that cannot well be over-estimated. Keep your cases of short incubation at home : they will infect others, and be themselves injured by removal.—*Med. Press and Circular, June* 1, 1881, *p.* 461.

## DISEASES OF THE NERVOUS SYSTEM.

### 12.—ON A CASE OF LOCOMOTOR ATAXY TREATED BY NERVE STRETCHING.

By H. Charlton Bastian, M.D., F.R.C.P., F.R.S., Physician to University College Hospital.

Locomotor Ataxy, dependent as it is upon a sclerosis of the posterior columns of the spinal cord, is a very intractable disease, and of late, new attempts have been made to modify its course by a procedure which would not, at first sight, seem likely to commend itself much to pathologists.

[In a case of Dr. Bastian's this affection was treated by stretching the sciatic nerve as follows :]

Feb. 5. This afternoon, while the patient was under the influence of ether, Mr. Marshall cut down upon the great sciatic nerve in the middle third of the right thigh, and stretched it

with his finger. With the nerve between his thumb and forefinger, he pulled it upwards from below twice, and afterwards from above downwards twice, making the nerve stand out like a tense thick cord in the buttock. The nerve was raised between one and two inches from the level of the skin, and four or five from its bed. The wound was dressed antiseptically. There was scarcely any shock during the operation, the pulse remaining of good quality, and about 100 per minute. The patient was put to bed; and, when he recovered from the ether, he could move his right ankle and toes, there being no motor paralysis of that leg, and no anæsthesia. About two hours after the operation, he complained of being chilly. The temperature was 98·4°; pulse 102, very small and compressible. Hot bottles were applied to his feet, which were very cold, but not one more than the other; and two drachms of brandy ordered every two hours. The patient had one dose; and at 8 p.m., five hours after the operation, was very comfortable, complaining of no pain anywhere in the leg or back.

Feb. 6. He was restless last night, and slept badly. There was no pain in the leg or thigh, but the constant aching pain in the hypogastrium still continued. There was no paralysis of the muscles supplied by the great sciatic nerve, the power of bending the ankle-joint and toes being the same as before the operation. That he might not disturb the wound in the thigh, he did not attempt to flex the knee. There was no anæsthesia anywhere; the tactile sensibility about the knee being, if anything, slightly improved. Appreciation of painful impressions seemed to be the same as before the operation.

Feb. 7. He slept badly, but did not complain of pain in the leg. During the early morning, there were involuntary flexions of the hip and knee joints three times. These movements were slower, more extensive, and more painless than the previous "jerkings." The slightest touch of the finger about the right knee was appreciated much better than before the operation. Painful impressions were perceived as before. There was no motor paralysis. He was in good spirits, and said he felt better than before the operation.

Feb. 9. He had slept well during the last two nights. He considered himself better than before the operation, as the leg felt warmer and more comfortable, and he could more readily appreciate a light touch on it.

[After various changes the report goes on as follows:]

May 8. The patient had been improving gradually since the last note. This morning he tried to walk. He required the support of two people to stand upright. He was exceedingly weak on his legs; but his gait was better than before the operation. He had more control over his legs, and he cleared the

ground better with the toes. Tactile sensibility over both lower limbs was perfect; and he could also appreciate the prick of a pin everywhere, and the difference between heat and cold. His power of moving the left ankle was decidedly better than before the operation, and he moved the hip-joint more forcibly. The legs felt much warmer than formerly; and their temperature was generally about 98° to 98·6°, the right being sometimes higher than the left. He still had slight pain in the lower part of his chest; but the old severe pain in the hypogastrium, which disappeared a few days after the first operation, had not been felt since.

Our patient was advised to submit to the operation of having his right sciatic nerve stretched as a kind of "forlorn hope." Originally, the performance of the operation on the left leg was not contemplated; but, soon after the first operation, the patient himself was so satisfied with the improvement which had been brought about in his condition, that he repeatedly asked for the other leg to be treated in a similar manner. Finally, after prolonged observation of the changes brought about in the right limb by the first operation, I no longer thought that the operation was contraindicated by the condition of the left limb—rather the reverse; and I accordingly asked my colleague Mr. Marshall to be good enough to operate upon the left sciatic nerve as he had done upon the right. His method of pulling the nerve in both directions, and with the fingers rather than with a hard spatula, is worthy of note. It is, of course, most desirable, in such an operation, not to injure the nerve-fibres.

The effects observed in our patient as results of the operation have been these. Within one week from the date of the first operation, he lost the continuous dull burning sensation at the hypogastrium, from which he had been scarcely ever free for several months, and from which he had suffered at intervals since the commencement of his disease. He has continued free from this pain up to the present time—that is, for rather more than three months—though of late he has occasionally felt a less continuous pain on each side of the lower part of the thorax. Marked lancinating pain in the limbs seem never to have been present in this patient, though in other cases, which have been reported such torturing pains have similarly been either greatly mitigated or caused to disappear by the operation of nerve-stretching.

He has had several attacks of diarrhœa similar to those to which he had been subject before the operation; and one of these attacks was severe, and associated with some cystitis. In other respects, however, the patient's general health has been somewhat improved. He has been taking his food well and sleeping better since the hypogastric pain disappeared. Still it is worthy

of note that the operations have done nothing to mitigate the occasional attacks of diarrhœa.

If we turn now to the condition of the limbs, we shall find that similar changes in their condition were observed after each operation, and that these effects are in part those to which Brown-Séquard has recently called the attention of the profession; viz., an increased temperature and an improved sensibility of the limb.

More marked and slower painless contractions took place from time to time in the limb which had been operated upon, in place of the slighter jerking and somewhat painful movements to which it had previously been subject. These were observed in each case on the morning after the operation, and they were subsequently repeated from time to time.

There was no *motor paralysis* in the course of the sciatic nerve, even on the same or on the day following the operation, in either leg. In the case of the right leg, the patient was able to move his foot the next morning (Feb. 6) as well as before; and afterwards he seemed to gain some amount of strength in this leg, judging from the improved manner in which he walked on Feb. 21. In the case of the left leg, on the morning after the operation (March 16), he was even able to move the foot better than he had done before during the previous five weeks; and a slight increase in power over the movements of this limb has continued to the present time (*i.e.*, for a period of eight weeks and a half), though there seems to have been no further or progressive gain in this direction.

The *sensibility* of the limbs was never very much impaired; but in each case, after the operation, the previous slight defect in tactile sensibility disappeared in the corresponding limb. Three weeks after the first operation, the tactile sensibility of the right limb seemed for a time to undergo slight daily variations; but, as the last note on May 8 shows, this variation was only temporary. The sensibility in each limb seems to have been restored by the operation.

The *temperature* of the *left* limb on the morning after the operation (March 16) was very distinctly warmer than the right, though for almost five weeks previously it had been observed to be persistently lower. In the right popliteal space it was 98°, and in the left 99·6°. Subsequently, the following variations were noted:—March 17—right 99°, left 98·6°; March 19—right 98·2°, left 98°; March 21—right 98·4°, left 98·8°; March 28—right 97·6°, left 97·8°. Attention was not particularly directed to the temperature of the *right* leg on the days immediately following the operation. At all events, there is no note till February 9, when the leg felt warmer, and was described by the patient as feeling much more comfortable

than it did before the operation. On the next day, the temperatures in the two popliteal spaces were found to be as follows: morning—right 97·8°, left 97°; evening—right 98·2°, left 97·2°. Other temperatures are recorded thus:—February 14—right 98·8°, left 97·8°; February 15—right 97·6°, left 97°; February 18—right 97·8°, left 96·2°; February 21—right 98°, left 97·2°; February 25—right 97·6°, left 96·8°; March 5—right still higher by 0·7° to 0·9° than left; March 12—right for last two days 0·2° lower than left leg; but on March 15 (morning of second operation)—right 97·6°, left 96·8°.

In another less advanced case of locomotor ataxy, which has since been treated in the same manner, now in Ward 7, the temperature in the limb operated upon did not rise above that of the other by more than 0·5°, and even this, or a smaller amount of elevation, did not continue for more than two weeks. The improvement in sensibility in this case was also slight and temporary. Here, again, no motor paralysis was produced at first; but there does not seem as yet (five weeks) to be any appreciable improvement in the patient's condition. He walks rather more steadily, but requires a little more support than before the operation. He also complains of a slight fixed pain in the right foot which was not previously felt. It is difficult, of course, to gauge the exact strength of the "pull" to which the sciatic nerve is subjected, but it is thought to have been a little stronger in this case than in the former patient. I mention this because it is probably a matter of considerable importance; it is quite possible that too weak a pull may produce little or no effect; but, on the other hand, too strong a pull may yield either no good results or results which are positively harmful.

The *power of walking* in our patient, poor as it is, is certainly better than it was before the first operation (just fourteen weeks ago), though I do not think it can be said that there has been any appreciable gain in this respect since the second operation (just eight and a half weeks ago). Still, when lying in bed, his power of moving the left foot and leg is very slightly increased, in comparison with what it was during the five weeks preceding this operation. The wounds, as might have been expected, have been rather slow to heal in these patients.

In the present condition of our knowledge, I do not think it profitable to attempt anything like a physiological explanation of the mode of action of nerve-stretching. One of the results seems clearly to be the induction of some amount of vaso-motor paralysis in the limb operated upon. The improvement in sensibility may be a result of this change in the vascularity of the limb, or it may be in a measure independent of it. It is worthy of note in this connection that daily variations seemed

to take place (about three weeks after the first operation) in the sensibility of the right leg without any corresponding variations in the temperature of the limb.

Although we cannot explain the exact mode in which nerve-stretching acts, we are not in a much better condition as regards many internal remedies which we know to have an undoubted power in modifying processes of disease. We do not on this account hesitate to use quinine or arsenic in ague, or salicylate of soda in rheumatic fever; nor is there any reason why, if nerve-stretching really seems to do good in this or in other chronic diseases of the spinal cord, we should not have recourse to such a procedure. Much of our therapeutics is still empirical rather than rational. What we have to ascertain, therefore, in the first place, is, whether the operation does or does not seem to do good.

Although it is still very doubtful how long the good effects produced by nerve-stretching in locomotor ataxy may last, it seems to me, judging from the results which have been published by others, as well as from my own experience in regard to this case, that its influence over the disease is so decided as to deserve further careful trial. Looking also to the effects which the operation produces upon the limbs, I am disposed to think that it may also prove of considerable service, in conjunction with electrical treatment, in certain cases of chronic spinal paralysis in children or in adults; and I shall take an early opportunity of giving the method a trial in some suitable cases. The increase in the temperature of the limb operated upon may decidedly help to improve the nutrition of its wasted muscles, and thus perhaps render them more amenable to electrical treatment.—*Brit. Med. Jour.*, *July* 2, 1881, *p.* 1.

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## 13.—NERVE-STRETCHING IN LOCOMOTOR ATAXY.

By J. Johnston, M.D., Bolton.

As surgeons are now advocating this operation, and as notices of several successful cases have appeared in the Journal, the following case may be of interest.

G. L., aged 39, married, pattern-designer and sign-painter, had for about twelve years suffered from acute transient pains darting suddenly through different parts of the body. These came on at intervals, without warning, and most frequently in the right leg, which showed the scars of an old necrosis of the tibia. There was a history of syphilis contracted at the age of twenty, and he confessed to having practised masturbation before marriage. About three years ago, he noticed that he was very unsteady on his legs, and that his walk was peculiar, and this slowly increased, until he was unable to

do more than walk across the floor. There was no personal or family history of chorea, fits, or any mental disturbance, and his habits had been regular and temperate.

He presented the characteristic ataxic gait and inability to walk without assistance in the dark, or to stand with his feet together and his eyes closed. There was an absence of the feeling as if walking on felt, velvet, or wool. In sitting down, as soon as the knees became semiflexed, he dropped down quite suddenly. In the recumbent posture, he could not tell the position of his legs; said he felt as though they were not resting on the bed at all; and had great difficulty in changing his position. Tickling the soles of the feet did not produce any reflex action. Cutaneous sensibility of the legs was much impaired, but there were no anæsthetic patches. His muscular power was good, and he was able to resist attempts to forcibly flex or extend the legs. There was entire absence of the patellar tendon-reflex (Westphal's symptom). There was slight ataxy in the arms, as he had some difficulty in dressing himself—the buttons troubled him; and his writing, formerly very good, was now very poor and shaky. The muscular sense or sense of weight was unimpaired. There was no incontinence of urine, but micturition was sudden. There was no insomnia. Sexual power and desire were weak. He had frequent attacks of the typical lightning-pains in the extremities, and complained of a dull-aching pain in the back, along with a girdle-feeling of constriction round the loins. At no time were there any of the *crises gastriques* of Charcot; and there was entire absence of any changes in the bones or joints. There was no ataxia of the eyeballs, no double vision, nor colour-blindness. The right eyelid was affected with ptosis, and there was diminished vision, which was found on examination to be due to white atrophy of the optic disc. He exhibited the Argyll-Robertson pupils, which contracted during accommodation, but not to light.

The patient being willing to submit to anything which afforded him the prospect of relief, I determined to try nerve-stretching, selecting the right sciatic, because the symptoms were most marked on that side.

April 24. Esmarch's bandage was applied to the upper part of the thigh. Dr. Smith, of Ashton, who assisted me, having anæsthetised the back part of the thigh at its middle third, a longitudinal incision, four inches long, was made down to the biceps, which was drawn aside. The great sciatic nerve was found at the inner aspect of the muscle: its sheath was opened, and the body of the nerve was then hooked on to the finger and pulled vertically upwards with some force, the whole weight of the limb being suspended by the nerve. This being repeated

three times; the nerve was then replaced, a drainage-tube inserted, the wound stitched and dressed with carbolised oil. The patient did not seem to feel the operation very much, even the sutures causing very little pain. The wound did not unite by first intention, but there were no bad symptoms from it.

It is now five weeks since the operation, and the result thus far is very great improvement in one symptom: the lightning-pains, which formerly were frequent and distressing, have now to a considerable extent disappeared. They are not nearly so acute, and they come on at much longer intervals than before. The improvement has been most marked during the past ten days; and, as it still continues, I am in hopes that the pains will ultimately disappear entirely. But, while he is more comfortable in this respect, I am sorry to be unable to report any improvement in the ataxic symptoms, which remain unchanged. His staggering ataxic gait and inability to stand with his eyes closed remain as before. There is, however, a slight improvement in the anæsthesia, and he can now tell the position of his legs.

*Remarks.*—1. The case confirms the statement of Dr. Gowers (British Medical Journal, 1880, vol. ii, p. 623), that "75 per cent. of the cases were of syphilitic origin," and of Dr. Dowse (*ibid.*, p. 925), that every case of locomotor ataxy, with very few exceptions, could be traced to syphilis as a cause. 2. It presented the three characteristic eye-symptoms, as noted by Dr. Hughlings Jackson—viz., paralysis of the parts supplied by the oculo-motor nerve, alteration of the pupils, and white atrophy of the optic disc. 3. The absence of *crises gastriques* and joint-alterations are a negative confirmation of Dr. Buzzard's theory regarding the connection between these symptoms (British Medical Journal, 1880, vol. i, pp. 244, 256-7; vol. ii, pp. 384, 743; 1881, vol. i, p. 330). 4. The operation, although somewhat disappointing in its result, as compared with those cases previously reported, was not so fruitless as in the case reported by Mr. Berridge, April 2. The marked improvement in the lightning-pains and the diminution of the anæsthesia are not to be despised, and I should not hesitate to recommend the operation in another case of locomotor ataxy.—*British Medical Journal, July* 2, 1881, *p.* 11.

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## 14.—ON CASES OF SPASMODIC DISORDERS IN THE LOWER LIMBS.

By C. Handfield Jones, M.B. Cantab., F.R.S., Physician to St. Mary's Hospital, London.

[Dr. Jones relates five cases of spasm of the lower extremities. The first case is as follows:]

The patient, F. C., was a young girl aged 13, the daughter of a carpenter, who was disabled from work by an injury to his

leg, and of a mother, whom I judged, and I trow not unjustly, to be fond, foolish, and anxious. She was herself a sleek-faced little damsel, who lay in her bed with great propriety, at any rate after the first few days, attired in a rather showy red dressing-gown, of a modern cut (as far as my imperfect erudition on such points enables me to affirm), and in bright yellow worsted slippers, which I learned were her own workmanship. She crochetted or did some such fancy work. Altogether there was a good deal in her "pose" to warrant the suspicion which more than one of you entertained, that her malady was largely compounded of, or based on, hysteria. This notion was materially supported by the circumstance that, about three months and a half previously, she had been in the hospital for six weeks on account of fits, which were stated to have been of very frequent occurrence, sometimes three or four in a day, but which were conspicuous by their absence during the whole or almost the whole of her stay. The first fit occurred on September 2, 1879, when she was struck on the left temple, and immediately fell down in a fit. Two days after this, while racing at a school-treat, she had another. Since then, she had been continually having fits, which came on after any excitement, and were usually ushered in by drowsiness; the patient then sat down, and the fit came on, and lasted from half an hour to five hours. After a fit, she generally complained of headache. On October 30, she had a fit in the morning, which lasted four hours; on her recovery, she had lost the use of her legs, and had not been able to stand since. She came to us on November 9, 1880. The notes, taken probably the day after, say that her aspect was healthy, that her manner was natural, and that she behaved well and gave no unnecessary trouble. Her legs were very sensitive to touch, though she could scarcely stir them from the bed, and she was quite unable to stand. When the faradic current was applied, there was no response for about twenty seconds, and then the muscles acted powerfully, and severe pain was felt. On tickling the soles, reflex contractions sometimes occurred, and sometimes did not; one foot was affected at times more than the other. The feet were at times pointed, and extension of them was painful, and strongly resisted by the calf-muscles. This, however, was not quite constant; to-day the right foot could be brought into its natural position. The patellar tendon-reflex was well marked. She complained of pain in the left back and on the left side of the abdomen. On the 12th, when taken out of bed and held up, she could not move her legs at all, or make any attempt to support herself; the feet were turned inwards, the soles raised, the legs in a state of rigid spasm. I could not flex them with any ordinary effort, and any great force applied to them caused much pain. When lying in bed, the rigidity at

times seemed to be less, but at others was complete. The remedies indicated were evidently such as might reasonably be expected to calm an excited state of nerve and muscle. To produce relaxation, I might have employed belladonna, chloral, bromides, physostigma, and others; but I selected two, one of which was an old well-approved means, and the other a modern, of which I had lately been making trial in the analogous state of asthma with advantage. I ordered a warm bath to be given every night, and two minims of a one per cent. solution of nitro-glycerine three times daily, with a teaspoonful of cod-liver oil twice daily. On the 15th, she could draw up her right limb fully, and allowed me to move it quite easily; it was in its natural state; the left was just as before, quite rigid in extension, and could not be flexed. I increased the dose of nitro-glycerine to three minims. On the 16th, the pulse was 90, soft. There was no giddiness nor flushing of the face. The right foot was drawn up when the sole was tickled; the left did not move; but she was conscious when the sole or the leg was touched. She was quite unable to stir the left leg voluntarily. There was no blueness or coldness of the left foot; it felt to the hand as warm as the right. On the 18th, a subcutaneous injection of one-sixtieth of a grain of atropine was directed to be made daily, and the other remedies continued. On the 20th, she had regained the use of both legs, could walk the whole length of Victoria Ward (thirty yards), and could just stand on either leg. Reflex action now occurred on tickling the sole of the left foot, or perhaps voluntary; the foot was drawn up, and the leg bent at the knee. She was first able to bend the knee in the warm bath on the night of the 18th. The sequela of the fit, the spasm, having thus yielded, the next indication appeared to be to prevent the recurrence of the primary disorder, for which, of course, bromide suggested itself. I ordered her bromide of ammonium gr. viij; tincture of cinchona ʒ ss; compound spirit of ammonia ♏ v; decoction of cinchona ℥ ss—three times daily; and to continue her oil. On the 22nd, she was walking about well, and could walk a good way along a single plank of the floor. On the 26th, she complained of a pain in her great toe, and looked, I thought, pale; I therefore ordered ten grains of saccharated carbonate of iron to be taken twice daily; and on December 2, I sent her out. She came to hospital on the 6th to show herself, looking very well; and, at my request, stepped up on an ordinary chair and jumped down again to the floor. I dismissed her apparently quite well, but shall not feel surprised if she returns, sooner or later, with some other neurosis, or a recurrence of the same. June 18, 1881. This expectation has up to this time not been realised.

The cases are all essentially similar. They were all certainly functional, not dependent on any gross lesion, probably not on

any demonstrable. In three cases there were distinct indications of the presence of rheumatism; in the two others, these were wanting. In one case there was positive evidence of the nervous system being in a very unsound state, weak and unstable, the infirmity being undoubtedly hereditary. In Case 1 (related above), the patient was affirmed to be very liable to fits; but, as none occurred while she was under my observation, and scarce any during her stay in the hospital on a former occasion, it is not very clear what their character was. Probably they were more hysterical than epileptic, yet not without some affinity to the latter. The occurrence of spasmodic paraplegia as the sequel of a fit is more after the manner of epilepsy than of hysteria, or it may be compared to the occurrence of chorea from a fright. The spasm in all but one was continuous; in the latter, the attacks were paroxysmal, and of brief duration. The cause of the disorder in the cases with rheumatoid affection was probably the unknown virus or *materies morbi* which usually excites articular inflammation, but may, as is well known, specially affect the brain or some other nerve-centre. In these, then, the derangement was toxic. In one case, it seems to have resulted simply from the instability of the nervous system, without any special excitant. Just as the weak brain occasionally fell into paroxysms of excitement—loss of control—so it was, but more persistently, with the spinal motor centre of the psoas and iliacus muscles.

The essential morbid state in all these, and in a multitude of similar instances, is *superexcitability*—a condition which, I have often stated, depends, not on excess in the force-generating faculty of the motor cells, but in impairment of the faculty whereby the evolution of force, the liberation of energy, is regulated. It is clear that motor centres must possess these two faculties; otherwise, as long as the cells were supplied with fresh blood, they would go on sending forth impulses, and muscular repose would be impossible. The condition of spasm is, therefore, a mode of paralysis; and the affinity between the two states has long been recognised. In some of these states, both faculties may be impaired, and force continuously evolved, but in small quantity. This occurs in senile and alcohol tremor, and in many cases of chorea. In other conditions, the generation of force may be very active, as well as its liberation; and it may be quite impossible to arrest the movements by any ordinary exertion of strength. When this is the case, the therapy may need to be modified correspondingly.

The remedies likely to avail in such cases as those above narrated seem to depend rather on the severity and persistence of the spasm, and on the state of the general system, than on the nature of the exciting cause. The spasm ceased under the continued administration of iron, quinine, nux vomica, in Case 4;

under full doses of assafœtida in Case 2; under valerian, cinchona, with iron, in Case 3; and under simple non-stimulating sedatives, nitro-glycerine, and conium, in Case 1 and Case 5. The varying *quality* of spasm is not easy to appreciate accurately; but it is very important to do so, for on this the treatment very largely depends. One case of tetanus may require poisonous doses of aconite or tobacco; another will yield to chloral; and a third, perhaps, to alcohol.

I have scarcely touched the question whether the disorder in Case 1 was hysterical, meaning thereby that it was not purely physical. Probably, it was so to a certain extent, yet not so much as to render physical agents useless. I can hardly doubt that the nitro-glycerine acted beneficially, and I advise you to try it when you meet with similar instances. As it relaxes vaso-motor nerve-organs, it may similarly affect musculo-motor.—*British Medical Journal, July* 2, 1881, *p.* 4.

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15.—ON THE TREATMENT OF TETANUS—CALABAR BEAN.

A girl aged three and a half years was seized with a severe attack of tetanus on the evening after she had sustained a wound in the occipital region. Dr. Silbermann ordered warm baths and choral hydrate, whilst he at the same time administered subcutaneous injections containing two centigrams of the extract of calabar bean. After two injections the spasm of the lower limbs disappeared. Two injections more cured the trismus and contraction of the muscles of the neck. The respiration, however, still remained quickened. On the following day one c.c. of the following solution was injected:—Extract of calabar bean, 20 centigrams. Distilled water, 10 c.c. The last symptoms of tetanus then disappeared, the respiration sank to the normal, and the cure proceeded uninterruptedly. In a second case, that of a child suffering from tetanus consequent on a burn, injections of calabar bean abolished the muscular spasm. The patient died, however, from cardiac lesions, due, as the author supposes, to paralysis of the muscles of the heart. For newborn children, Monti invariably prescribes six mil. of the extract, and six centigr. for older children. Silbermann, however, considers that the latter dose is too large, and recommends that not more than two centigrams should be given. Jour. des Connaiss Med.—*Practitioner, June* 1881, *p.* 457.

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16.—ON THE TREATMENT OF ANOSMIA AND HYPEROSMIA.

By Julius Althaus, M.D., M.R.C.P., Senior Physician to the Hospital for Epilepsy and Paralysis.

[Anosmia means absence of smell—Hyperosmia, excessive sensitiveness.]

There are two medicines which have a decided and antagonistic influence on olfaction—strychnia will exalt, while mor-

phia will impair and deaden it. Strychnia applied locally to the mucous membrane of the nose as a snuff, or taken internally in a suitable dose, wonderfully increases the keenness of the sense, the local application being the more effective of the two. Smaller quantities of scents are perceived, and their impression is more precise and pleasant. The sensitiveness to pungent odours is so much increased that snuff, ammonia, and acetic acid cause positive pain. It therefore appears that the excitability of the fifth nerve is likewise exalted. Morphia, on the other hand, has only insignificant effects when applied as a snuff; but if taken internally, and more especially if injected subcutaneously, confuses the appreciation of odours to such an extent as to produce a kind of chaos. Smell is not actually destroyed, but the odours appear, as it were, at an enormous distance, although the bottle containing them may be held right under the nose. The olfactory nerve is, in fact, narcotised.

Most other medicines which have an influence on olfaction act indirectly, and do so by altering the condition of the fifth nerve. Thus atropia and daturine cause great dryness in the mucous membrane, more particularly when injected subcutaneously. This interferes with smell, as has been pointed out above. The effects of pilocarpine on olfaction have not yet been studied, but will most probably be found antagonistic to those of atropine.

In anosmia I therefore prescribe one-twenty-fourth of a grain of strychnia mixed with two grains of powdered sugar, to be used as a snuff twice a day; and I increase the dose to one-sixteenth and one-twelfth of a grain should no effect be produced. In the hyperosmia of epileptic patients, when preceding attacks, I inject one-sixth of a grain of the acetate of morphia with one-sixtieth of a grain of the sulphate of atropia subcutaneously. This soothes the explosive tendency of the nervous centres, and acts as a preventive of epileptic attacks.

Electricity has been recommended by Erb and others for the treatment of anosmia; but as I have shown that the first pair is only influenced by a current of extreme power which would do harm in other ways, I warn you against the use of such a remedy for such a disease. Where syphilis is suspected or recognised iodide of potassium should be given.

In conclusion, I must say a few words on the *diagnostic importance* of certain smells in the sick-room, which was formerly much insisted upon; indeed, whole treatises have been written on the recognition of disease by sniffing. Dr. Heim, who was the popular physician of the day at Berlin some fifty years ago, recognised measles, scarlet fever, and small-pox by their peculiar smell on first entering a house, and before having seen the patient. Mr. Bernard of Upton Park has recently

recorded in the Lancet two cases of small-pox in which the patients themselves perceived a dreadful smell, apparently just at the moment of being exposed to contagion; and one of them when suffering from the eruption said that his perspiration had the same smell as that which made him sick before. When attending Skoda's clinique in Vienna, twenty-five years ago, I noticed that this celebrated teacher was in the habit of snffing when approaching the bedside of patients suffering from the last stages of pneumonia, phthisis, typhoid fever, &c.; and he would give a bad prognosis when he perceived what he called the "cadaverous smell." Mr. Crompton of Birmingham has noticed a peculiar earthy smell from the body a week or a fortnight before death, which, he says, has never deceived him—an appropriate illustration of the saying, "Earth to earth." Dr. Begbie distinguished typhus and typhoid fevers by the sanguineous (others call it "mousey") smell of the former. Professor Parkes has noticed a peculiar odour in the skin of cholera patients. A pungent smell in the chamber of a lying-in woman shows that lacteal secretion is well established, while an ammoniacal smell has been said to indicate the approach of puerperal fever. Many women emit a peculiar odour while menstruating, which resembles a mixture of blood and chloroform; and this is believed to arise not so much from the discharge as from the more pungent character of the sweat secreted in the axilla. Persons of costive habit have a fæcal smell; and this is also often noticed in hypochondriacs and lunatics. In uræmia, whether owing to kidney disease or to severe retention of the urine, a urinous odour is emitted by the body; and the presence of pus in some part of the body has been recognised by a peculiar warm-milky smell of the patient.

Apart from the odour of the sick-room and the body generally, the smell of the sputa, urine, fæces, sweat, ulcers, &c., was carefully noted by the older practictioners, and utilised for prognosis and treatment. Unquestionably there was much that was fanciful in such ideas; but occupied as we are at present with the study of more precise and definite symptoms, we have, perhaps, gone to the other extreme in neglecting such signs altogether. Everybody has his own special odour, and this varies according to the circumstances of life, the food taken, and the state of the health in which he happens to be. That it should be altered in disease, and that special diseases should have special odours, is only what one would expect; yet the increase of cleanliness and ventilation has no doubt done away with a large variety of smells which formerly used to assail the nostrils of the physician.—*Lancet*, *May* 21, 1881, *p.* 814.

## 17.—COMPLETE APHONIA OF FIVE YEARS' STANDING, CURED BY THE REPEATED APPLICATION OF FARADISATION TO THE VOCAL CORDS.

By Robert Torrance, L.R.C.P. Edin., Surgeon to the Newcastle-on-Tyne Throat and Ear Infirmary.

Miss A. P.——, aged twenty-four, consulted me in October 1880, for loss of voice of nearly five years' standing. She looked delicate, but did not complain of weakness, and informed me that she had had an ulcerated sore-throat, and lost her voice on leaving a heated room in November 1875. On recovering from the sore-throat, her voice did not return, when the regular medical attendant applied caustic two or three times, but without any beneficial effect. She then consulted several eminent practitioners, and amongst them a leading physician in Dublin, who recommended galvanism to be applied by means of a battery, but the result was the same as before. Preparatory to my making a laryngoscopic examination, it may be stated that the fact was proved that the loss of function was not due to hysteria, as she was placed completely under the influence of chloroform, when she did not speak, but continued to whisper. The instrument then showed that the vocal cords were in a very relaxed state, and crumpled up as it were near their middle, but otherwise apparently quite healthy, and galvanism seemed clearly indicated in the case. It was therefore strongly recommended to apply it for some time by one of Pulvermacher's chains, but this failed, when it was continued by means of a metallic brush for a much longer period, but there was not the least return of the voice. Knowing that the alternation of topical remedies often proved efficacious in the treatment of chronic inflammation of mucous passages, they were prescribed during the whole of this time, but neither of them, combined with the former, produced any good effect. The cords were then faradised by means of Mackenzie's electrode, when after very few applications of the electro-magnetic current the voice was partly restored, but as a very harsh "croak" at first, and very monotonous. She was asked to sing over a scale of music, but every note was pronounced in the same tone, and she could not modulate her voice either piano or fortissimo. After the current had been repeated at gradually lengthening intervals, however, the voice was permanently restored, and now she speaks in a clear and natural tone, which had been lost for nearly five years. She was seen a few weeks ago, and I heard from her own lips that the cure had been permanent.

*Remarks.*—This patient, anxious to regain her voice, had previously given everything prescribed for her, both local and

constitutional, a fair trial. Tonics and zinc pills were persevered in for a very long time, as well as the inhalation of vapours impregnated with different volatile principles. Powders were introduced by insufflation, and this again followed by various escharotics, but without the least benefit resulting until the vocal cords were faradised, which proved there had been no structural disease, but that the case resolved itself into one of functional aphonia or vocal weakness. The case requires no further comment, but the superiority of the internal method of faradisation must certainly be admitted.—*Lancet*, *May* 7, 1881, *p.* 735.

## DISEASES OF THE ORGANS OF CIRCULATION.

### 18.—ON ANÆMIA AND CHLOROSIS.

By Sidney Coupland, M.D., F.R.C.P., Physician to the Middlesex Hospital.

Pernicious anæmia must be considered as the outcome of a severe anæmia, whether symptomatic or idiopathic, its progressive course and frequently fatal issue being induced by changes, of which there is yet but little information either in the normal formation of the blood or in its destruction; and I propose here to speak, in the first place, shortly about chlorosis, which I believe to be a form of anæmia depending on similar changes, and therefore to be considered as falling under the head of idiopathic anæmia.

The reasons which, so far as I can gather, are advanced in favour of regarding chlorosis as a distinct disease, are these: its almost complete limitation to the female sex; its apparent dependence in some way on the menstrual function, and the changes undergone by the organism at puberty; certain nervous conditions, and certain peculiarities in the composition of the blood, and the structure of the blood-vessels. To consider each of these in turn. It is well known that the female sex is more readily influenced by anæmiating causes than the male; the blood is less rich in hæmoglobin, and its quantity is less. Any influence liable to create a demand on the blood is more likely to lead in the female to anæmia than in the male; and not only at puberty, but during pregnancy, the puerperal period, lactation, and the menopause, anæmia may arise and become profound. There is no essential difference between the anæmia produced at any of these periods. Nor is the limitation to the female sex of a condition indistinguishable from chlorosis invariable. I have at present under my care a youth, well developed and well nourished, who is the subject of an anæmia conforming in its history and characters, and I may add in its

curability, to the most typical cases of chlorosis: and, from time to time, such cases of male chlorosis are recorded. More than this, in later life, the male, like the female, appears to be liable to the development of an insidious anæmia, without wasting, which in all its leading features resembles chlorosis. It may be initiated by the same influences, mental, physical, hygienic, and other, which initiate chlorosis; it is not so common or so frequent, because in adult life the balance between blood-formation and destruction is more evenly maintained.

The dependence of chlorosis upon the menstrual function is not so absolute as is often supposed. The importance of that function and of its regular continuance is doubtless great, and of considerable influence upon the blood; and, at puberty, there must be a considerable readjustment of the forces of the organism when the processes of ovulation and menstruation are established. There must be an increased demand on the blood then and at every recurring menstrual period; and, although we may be unable to state precisely what the influence is, we are persuaded that there is a connection between the normal evolution of the blood and of these processes. At the same time, menstrual irregularities often neither precede nor accompany the development of an anæmia indistinguishable on other grounds from chlorosis; whilst both amenorrhœa and menorrhagia are as frequently secondary to the anæmic condition as initiatory of it.

The same might be said of those nervous symptoms which frequently predominate in chlorotics to such an extent, that some have desired to place chlorosis among the neuroses. For, whether we regard the mental and emotional characteristics, or the liability to neuralgiæ and other nervous disorders; whether we consider the influence of psychical perturbations in determining the development of the anæmia, there is no firm distinction between chlorosis, as generally understood, and ordinary anæmia.

There remain two very important reasons which, if established, should suffice to justify the separation. The first is one to which I have frequently referred—viz., that in chlorosis the alteration in the blood is solely a diminution in its hæmoglobin, and in no other constituent. If this obtained of no other anæmia, the distinction would be of value. But, unless we enlarge the boundary of chlorosis until its territory becomes conterminous with that of idiopathic anæmia, this distinction will not hold. For it has not been proved, except in a few cases of pernicious anæmia, that the serum-albuminates are diminished in other forms of idiopathic anæmia besides chlorosis. There would seem to be no evidence of such diminution except when dropsical symptoms occur, and in those cases where there is general

inanition. But in very many of the cases of idiopathic anæmia of the adult, the body is well nourished; and in this respect shows no difference from chlorosis. Lastly, there is Virchow's discovery of certain vascular anomalies in chlorosis, which of themselves, if of general occurrence, would suffice to create a distinction on the surest basis—viz., an anatomical one. I may be permitted to briefly describe these anomalies, which have also been met with by Rokitansky and Bamberger. There is considerable narrowing of the aorta, which can hardly admit the little finger, instead of the thumb, its normal size. It is quite infantile in size. Its walls are much thinner than normal, but their elasticity is very marked, even excessive. The intima is the seat of irregular thickenings in the form of wavy or trellice-like elevations, with ridges, between which are depressions. The inner coat is, moreover, often the seat of diffuse fatty degeneration, limited to the superficial layers, and forming yellow patches and striæ, especially between the intercostals in the posterior wall of the aorta. Sometimes, this degenerative change extends to the muscular coat. Finally, there are anomalies in the origin of the branches of the aorta, particularly seen in the irregular disposition of the intercostals. With these vascular imperfections, there is sometimes a small imperfectly developed heart, but more often a large one, dilated and hypertrophied. The reason for this diversity is explained by Virchow, who, believing that the whole condition is one of arrested development of the vascular system (associated sometimes with stunting of the body), and, one may add, of the blood, would recognise a small heart as part of this general change; but, if the volume of the blood increase, this, together with the narrowness of the aorta, would be a sufficient cause for the enlargement. This vascular hypoplasia may or may not be associated with an ill-developed condition of the uterus and ovaries, which Rokitansky thought the rule in chlorotics. But neither of these congenital defects—or, more correctly, defects in the evolution of the vascular or of the generative apparatus—can be considered as underlying every case of chlorosis, or, at any rate, existing as a cause of the anæmia. Moreover, the vessels are liable to great variations in size; the intercostal arteries are very inconstant in their mode of origin; and narrowness of the aorta has been often described in cases where there were no symptoms of chlorosis during life. It is, however, a valuable and suggestive contribution to the subject, opening up the line of thought that, in chlorosis, we have a condition dependent on imperfect evolution of the blood and vascular system. But no proof has been given that the diminution in the size of the vessels has not followed upon diminution in the total quantity of blood.

The history of chlorosis presents, in the majority of cases, a

distinct etiological factor or factors, which cannot be ignored. Those who are most frequently its subjects are young women who have exchanged the light and air of the country for arduous domestic work in a town house, withdrawn from sunlight, undergoing considerable physical exertion in climbing stairs, or engaged in sedentary occupations in crowded and ill-ventilated rooms, or in many other ways subjected to conditions which we know to be prejudicial to healthy nutrition; whilst, at the same time, by reason of their age and sex, they are more susceptible of such influences. There are changes then at work, both around and within the organism, all tending to the same end. It would be absurd to eliminate from the category of chlorosis all the cases in which there are these etiological factors, because in other cases the disease developes without them; for it is impossible to say to what extent they act in inducing the anæmia. And the symptoms of chlorosis are those of anæmia. The increasing pallor, breathlessness on exertion, palpitation, headache, vertigo, and general nervous irritability, the fatigue induced by slight effort, the physical and mental inertia, the cardiac and vascular signs, the marked thirst, frequent derangements of digestion, and the character of the urine. These and other symptoms can be directly attributed to the anæmic state. Nor is the course of chlorosis quite apyrexial in all cases. It is often so, but it is not very unusual to find a temperature of about 99°, with slight exacerbations to 100° or 101°, a mimic reproduction of the irregular "anæmic fever" that appears in pernicious anæmia. Finally: What are the characters of the blood in chlorosis as regards hæmoglobin and corpuscles? This has been thoroughly inquired into of late years; and, in my first lecture, I referred to some of the facts concerning this matter.

I may briefly recapitulate and extend these points. There is invariably a reduction in the total quantity of hæmoglobin, a reduction reaching, according to the early researches of Duncan, about one-third of the normal. According to Quinquaud, the hæmoglobin is diminished about one-half in moderate chlorosis, varying between 70 and 30 grammes, instead of 125 grammes (which is the normal quantity), per 1,000 grammes of blood, and the capacity for oxygen is very greatly reduced. The same observer declares further that the chief saline constituents of the corpuscles—the potash salts and chlorides—are appreciably diminished, but that there is no change in the amount of the stromal globulin. In a series of observations by Hayem, where the number of corpuscles was estimated in relation to their richness in hæmoglobin, this latter was found to be on an average about 50 per cent. of the normal, and in a few cases, in which I have made similar calculations, this

diminution has been almost as marked. But there is not, as a rule, a corresponding diminution in the number of corpusles. The mean of eighteen numerations by Hayem gives 3,520,000 corpuscles per cubic millimètre of blood, or 70·4 per cent. of the normal; and of seven cases, I find a mean of about 3,000,000, or 60 per cent., there being, however, remarkable variations in the total number of corpuscles in different cases. For example, in one well-marked case, where the percentage of hæmoglobin was only 45, the number of corpuscles was 4,058,000; whilst in another the number of corpuscles was only 2,090,000, with 32 per cent. of hæmoglobin. Such examples as these—and they might be multiplied—prove what I have before pointed out, that the number of corpuscles is only one factor in the degree of an anæmia, their value as to hæmoglobin being the more important factor. Especial attention has been paid in chlorosis, as in pernicious anæmia, to alterations in the form and size of the corpuscles. Malassez declares that the corpuscles are, as a rule, larger than those in health in the ratio of 1·09:1, and others have found a certain number of truly giant corpuscles, with a diameter of 12$\mu$ instead of 7·7$\mu$ (Hayem). More striking, however, is a departure from the normal in the contrary direction, such, according to Hayem, occurring in undue proportion. He lays much stress upon the abundance of those small elements or "hæmatoblasts," which, it will be remembered, he considers as the early form of the adult corpuscle, and believes their accumulation to point to the incomplete development or evolution of the blood. The same observer has also noticed great variations in the form of the corpuscles, which bring to mind the variations described in pernicious anæmia by Quincke. I cannot say that I have been enabled to confirm this; certainly the corpuscles seem to be very variously sized, and to be more plastic and softer than in normal blood, forming rouleaux which are far more irregular, where the corpuscles, too, seem to be flattened out and otherwise slightly altered in form; but the extreme variations in size and in form, except after exposure (when they more rapidly become crenated than do healthy corpuscles), I have not seen.

The effects of treatment, especially of ferruginous medication, are so remarkable in those cases of idiopathic anæmia which are styled chlorosis, as to be in sharp contrast with the other forms occurring in the adult. In a very short time, under such medication, the blood regains nearly its normal standard. Sometimes this improvement is permanent, but often the anæmia returns at some later date, under the influence of some exciting cause. There is an anæmic tendency in such individuals which might be explained on the anatomical

defects described by Virchow (in which case the disease would be practically incurable), but which seems more probably dependent on a defective evolution of the blood-forming organs.

I have ventured to point out these matters because of the difficulty, which I feel sure is a real one, of deciding in any given case whether it is a chlorosis or not. It is not a mere question of nomenclature; if that were all it would matter no whit by what name we signified these conditions; but it is the difficulty which has arisen in consequence of the word "chlorosis" being held to convey more than the word anæmia, and being also arbitrarily considered inapplicable to idiopathic anæmia arising in later life. It may be most desirable, as Immermann (in his article on chlorosis in Ziemssen's Cyclopædia) rejoices to think it is the case, that in chlorosis we have a distinct malady rescued from being merged in the "great ocean of anæmia"; but, unless its distinctive features can be more sharply defined than they are at present, the difficulty of separating it from other forms of idiopathic anæmia will constantly be felt.

I desire now to speak shortly of two of the more constant and striking effects produced by the anæmic condition—the signs furnished by the heart and blood-vessels, and the influence it has in determining fatty degeneration. Upon the former of these points, which has been the object of much controversy and speculation, I hardly feel qualified to speak with authority, not having studied the matter so deeply as many. It seems to me, however, that, as regards the production of so-called hæmic murmurs, we have to consider, not only the factor of the blood-impoverishment, and especially its diminution in quantity, but also the factor of the conditions of the walls of the heart and blood-vessels induced by that impoverished blood. Indeed, the idea that the murmurs are solely due to the first of these factors has, I believe, been almost abandoned; it did not afford an adequate explanation, and seemed to be contrary to physical laws. As regards the purely *cardiac* murmur, there are at least two conceivable explanations for it in which the condition of the muscular walls (dependent on the anæmia) is primarily concerned. One of these is that the heart is dilated, and the murmurs are produced by its cavities being incompletely filled, and the other that there is actual regurgitation through the tricuspid and mitral orifices owing to the imperfect action of the enfeebled papillary muscles deranging the mechanism of the valves. Besides the cardiac bruits, there are murmurs produced over the pulmonary artery and aorta. All of these murmurs are systolic in time, and vary much in intensity and situation; the most constant seat being at the base of

the heart, the next at or within the left apex. Dr. Pearson Irvine, whose loss we have had so grievously to deplore, studied this subject for a long time, and embodied his conclusions in a paper read before the Royal Medical and Chirurgical Society in 1877. He started from the ground that dilatation, especially of the left ventricle, is the chief cardiac change in chlorosis—an opinion promulgated by Stark—and endeavoured to explain the murmurs, not obviously vascular, on the fact of this dilatation. One may admit the fact that in many chlorotics there are signs of this dilatation. The matter, however, is very difficult of clinical proof, but it is supported by the *post-mortem* evidence of hypertrophy by Virchow and Lewinski—a hypertrophy which is as conceivably produced secondarily to a dilatation, as to a narrowed aorta. The known relation between anæmia and fatty degeneration of the heart supplies us with ground for believing that in slighter cases the heart muscle is enfeebled; and probably also its innervation is affected by the impoverished blood. Dr. Irvine distinguished four cardiac murmurs in chlorosis, having their points of maximum intensity over the left auricle and its appendix, at the left apex, over the fourth left costal cartilage, limited there or transmitted downwards to the right or left, and lastly, in the fifth left space, below it or over the sternum adjacent to it. He was inclined to attribute the production of these murmurs to the dilatation of one or both ventricles, and did not favour the view that any of them were due to regurgitation. The regurgitant hypothesis, which explains the auricular murmur as well as those met with about the region of the apex, is supported on the left side by the almost constant accentuation of the second pulmonary sound, and on the right side by the occurrence of jugular pulsation. The mechanism of this regurgitation may be either a slight inadequacy in the contraction of the papillary muscles, or it may be dependent on dilatation. Although the basic systolic murmur may be in many instances due to this regurgitant eddy into the auricular appendix, there can be no question that bruits are heard strictly over the aortic and pulmonary areas. Of the mode of the production of the former (which are not common) no adequate explanation has been given; but of the latter, the true pulmonary bruit, we have Quincke's view that, in the cases where it is marked, the lung is retracted and the pulmonary artery slightly compressed at every systole; and we know how pressure by the stethoscope will increase the intensity of these bruits.

The murmur heard in the carotids and other arteries is only an exaggerated degree of what can be heard in health, and is probably due to the impaired tones of the vessel allowing it to be more readily influenced by slight pressure.

The hum in the jugular vein—to which more significance has been attached than it merits, as shown by Dr. Herbert Davies—is produced by pressure, and increased in intensity whenever the flow of blood is accelerated. This is illustrated in the influence of posture—its increase in the standing position, in the rise and fall of the otherwise continuous blowing sound with the respiratory movement, the increased respiration into the chest with every deep inspiration being accompanied by increase in the intensity of the murmur, which can be entirely arrested by forced expiration. It is noticed also that the auricular and ventricular diastole influence slightly the intensity of this bruit, so that in it we have a measure of the variations in celerity of the venous blood-flow.

I ought not to leave this part of the subject without alluding to the hypothesis advanced by Dr. Goodhart (Lancet, 1880, vol. i, p. 479), that anæmia may be at the foundation of some of these valvular diseases, especially of the mitral valve, the etiology of which is still obscure. He thinks the evidence conclusive that in anæmia there is ventricular dilatation, just as there is *post-mortem* evidence of muscular degeneration, and suggests that the continuance of regurgitation may submit the valves to so constant and irregular a strain as to lead to alterations in their intimate structure, thickenings and puckerings, productive of permanent regurgitation, and possibly some stenosis.—*British Medical Journal, April* 16, 1881, *p.* 589.

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## 19.—STERTOROUS BREATHING IN APOPLEXY, AND THE MANAGEMENT OF THE APOPLECTIC STATE.

By Robert Bowles, M.D., Folkestone.

In the investigation of the causes of stertorous breathing in apoplexy, I found that they were mechanical, and could at all times be so changed as to alter altogether the nature of a case, and often to make the difference of recovery or death; and, moreover, that the principles involved applied not only to apoplexy, but to many abnormal conditions allied to it. The subject having been now before the profession for twenty years, one is surprised to find how little attention appears to have been directed to it in our medical schools. Younger members of our profession to whom I have spoken, certainly do not realise its importance; and yet the value of a knowledge of it in the management of the apoplectic state is far greater than bleeding, blistering, calomel, croton-oil, and the rest.

The removal of the causes of stertor so immediately changes the aspect of a case, that the question of blood-letting is at once solved in the clearest and surest manner. The truth is, two separate conditions of the apoplectic state have been

jumbled together and treated as one: the cerebral affection, and the condition of suffocation consequent upon it. Stertor, in one sense, is but a croup in the pharynx, or apoplexy *plus* suffocation, as croup is laryngitis *plus* suffocation. We feel it necessary to relieve croup by a serious operation; whereas stertor is left to itself, although it may be relieved by merely changing the position of the body.

On referring to the literature of the subject, I have been astonished to find how difficult it is to draw any conclusions from the descriptions of the disease, or the treatment to be adopted. Authors are not agreed; and one of our most distinguished neurologists, in an article on Apoplexy, in a recent important work on medicine, with infinite labour, appears to arrive at the conclusion that, in apoplexy, we can know nothing, we can foretell nothing, and we can do nothing. This confusion arises in great measure from the stertorous breathing, converting all cases in which it is present into cases of apoplexy *plus* suffocation.

It is agreed that there are cases of apoplexy in which the face is pale, and the pulse small, and in which bleeding is not to be thought of, and also that there are cases in which stertor is not present; but I cannot, with all my diligence, find out from any works that have been open to me, whether these two conditions, that is, the pale face and the absence of stertor, were coexistent. There are no observations made by any author as to the position of the patient in the non-stertorous cases.

Suffocation, added to grave mischief in the brain, must of necessity affect not merely the symptoms and progress of cases, but also their mortality. Those only who have observed the extraordinary change on the removal of suffocative stertorous breathing, can judge how the diagnosis and prognosis are affected by it, and, not less so, the treatment and morbid anatomy.

Most modern writers on apoplexy adopt the general views of Dr. Abercrombie, and naturally, from the broad division of cases into sthenic and asthenic, are disposed to bleed in the former, and to avoid it in the latter; whereas, if we look upon the hard slow pulse as the result of the heart labouring to overcome an obstruction in the lungs (suffocation), we shall at once see that our first duty is to remove this obstruction, and thus simplify the case.

Heberden and Fothergill were opposed to bleeding in any case, and the latter has made some curious suggestions which pertain to the subject of this paper. He says that "even the hard, full, and irregular pulse, which seems imperatively to call for a very free use of the lancet, is often an insufficient guide, since it may be that struggle which arises from an exer-

tion of the *vires vitæ* to restore health." From what has already been said, you will readily guess that I should say: "This strong pulse arises from an exertion of the *vires vitæ* to overcome vascular obstruction caused by gradually increasing suffocation."

Niemeyer, more than others among recent authors, has attempted to be systematic, and to clear away the confusion attached to apoplexy; but, like others, he fails, from not discriminating between the apoplexy and the suffocation. He believes that the shock and oppression of the apoplectic state arise from anæmia of the brain-substance, from sudden compression of the cerebral capillaries; this anæmia is always seen after death, and is shown during life by the very symptom which has always had a contrary interpretation—"a remarkable pulsation of the carotids." This, instead of being a sign of increased pressure of blood to the head, really indicates that the flow of blood into the skull is obstructed "by the space," he says, "in the skull being affected, so as to prevent the escape of blood from the afferent vessels"; throwing the blood back, as it were, into the carotids.

As a consequence of this view, under the head of treatment, he says: "It is evident that, under some circumstances, venesection is a very useful remedy; under others, it is very injurious, and the indications for it may be very exactly given. In order that as much arterial blood as possible may enter the brain, we must try to facilitate the escape of venous blood, without, however, diminishing the propelling power too much" (what a plea is this for removing suffocation): then he continues: "If the impulse of the heart be strong, and its sounds loud; if the pulse be regular, and no signs of commencing œdema of the lungs exist, we should bleed without delay. If, on the contrary, the heart's impulse be weak, the pulse irregular, and the rattling in the trachea has already begun, we may be almost certain that bleeding would only do harm, since the action of the heart, which is always weakened, would be still more impaired, and the amount of arterial blood going to the brain would thus be still more decreased."

The simple relation of some of my early cases will best illustrate what usually happens in a case of apoplexy, and how it may best be managed.

*Case* 1.—In October 1863, Miss B. was seized with apoplexy. On my arrival, there was a partial return to consciousness, and the left side was found to be paralysed; there was pharyngeal stertor when in the recumbent posture, and she appeared uneasy when placed on her right side; she was therefore placed on her left, when the stertor ceased. A blister was applied to the nape of the neck, and she remained in this position for

nine days. She was now better, and spoke to me. Fearing a bed-sore, I desired the nurse to change her position, by turning her from her left to her right side. Soon after this was done, she was distressed for breath, and the countenance became livid. On my arrival, I found the difficulty of breathing gradually increasing; the blistered surface, as well as the ear upon which she had lain, of a dark purple hue; and the pulse, which had before been weak and irregular, full and bounding. There were large mucous *râles* over the whole chest; she was quite unconscious, and death from suffocation was imminent.

Finding that these symptoms supervened upon the change of position, I had her replaced upon her left side, and immediately the pulse sank, the mucous stertor ceased, the breathing was relieved, the lividity of countenance passed away, and the blistered surface, which had been almost black, resumed a bright cherry-red colour. This additional shock, however, proved too much for her, and she died the same day, peaceful and conscious.

The salient points of this interesting case are these:—1. Pharyngeal stertor ceased when the patient was placed on her side; 2. There was a slow but gradual improvement subsequently to this; 3. Mucous stertor and imminent death supervened when she was changed to the opposite side; 4. Instant relief followed on resuming her original position; 5. A return to consciousness was coincident with the cessation of stertor; in other words, with the removal of the respiratory difficulty.

On a careful examination of the chest after she became quiet, I found all *râles* slowly fade away from the right side, or that which was uppermost, and the natural breathing return; but the left lung, which had been dependent throughout, was dull on percussion, and deficient in respiratory murmur.

The explanation now became clear, viz., that the dependent lung had become filled with some mucous fluid, and that, on changing the side, the fluid by gravitation was finding its way across the trachea to the opposite lung; but, in doing so, it had been churned into foam by the ingoing air, giving rise to mucous stertor; and this foam, by filling up the larger bronchial tubes, was quickly causing suffocation, with all its usual results.

As a point of management, then, in cases of apoplexy, it would appear necessary to keep the patient on one side, and not to change it; but which should this be? Healthy people, when lying on the side, breathe chiefly with that side which is uppermost, for the intercostal and other thoracic muscles of the lower side are fixed between the weight of the body and the bed, and the breathing of this side is almost entirely diaphragmatic. It must be remembered, too, that, in placing the

paralysed side downwards, the injured side of the brain is upwards, and, therefore, relieved from hypostatic congestion, a condition always liable to occur when an injured part remains dependent.

In my original paper, in the Transactions of the Royal Medical and Chirurgical Society, three varieties of stertor were defined :—

1. *Palatine Stertor*, when the air, in rushing through the nose or mouth, causes a vibration of the soft palate.

2. *Pharyngeal Stertor*, when the air passes through the narrowed interval between the base of the tongue and the posterior wall of the pharynx.

3. *Mucous Stertor*, depending upon air bubbling through mucus in the larger air-tubes.

Besides these, there is occasionally, but only very occasionally, what may be called a *laryngeal stertor*, heard most commonly during the inhalation of chloroform, which has been pointed out by Professor Lister. Whether this arises from a spasm of the glottis, or from paralysis of some of the laryngeal muscles, I am not prepared to say. There is, however, a *nasal stertor* which belongs more to the apoplectic state, and, as far as my experience goes, is often a symptom of the gravest kind. It arises from paralysis of the nerves supplying the elevators and dilators of the alæ nasi ; so that the ingoing air, as in sniffing, draws the alæ nasi towards the septum, and sometimes causes a serious obstruction to the breathing, and certainly hastens death, as well as needlessly distresses the bystanding and sorrowing relatives.

*Case* 2.—A lady, sixty years of age, fell head-foremost down stairs, and was taken up unconscious. She had complained much of head-discomfort in the morning, but nevertheless had been out for a short walk. The weather was thundery. On my arrival, immediately after the fall, there was considerable ecchymosis at the outer angle of the left orbit ; but there was no bleeding from the ears, nose, or mouth ; nor was there any extravasation beneath the ocular conjunctivæ. I found her wholly unconscious, breathing stertorously, and vomiting. The right pupil was dilated and fixed ; the left very sluggish. When she was turned on her side, the stertor ceased ; the aspect of the face became almost natural ; and she moved her left arm and leg, and remained like a person quietly asleep for twenty-four hours. At this time *nasal* stertor commenced, and gradually increased in intensity ; and, *pari passu*, the face became congested and turgid, the veins of the temple stood out in bold relief, and in about an hour she died.

Dr. Monckton saw this case with me in consultation ; and I was able to demonstrate to him how stertor and its conse-

quences instantly recommenced in this poor lady's case when she was placed in the supine position, and also how easily nasal stertor could be removed either by pressing the tip of the nose upwards, or by dilating the nares with the handle of a salt-spoon.

There is yet one other form—the puffing out and flapping of the cheeks and lips—which may be fairly dignified with the title of *buccal stertor*. Now, although this last does not give rise to any respiratory difficulty, it is nevertheless, like nasal stertor, of importance in prognosis, and useful for purposes of definition. Like nasal stertor, too, it is dependent on paralysis of the portio dura, and therefore indicates the approach of the intracranial mischief towards that part of the brain which governs the functions of organic life, or (which is a very important alternative) that both it and nasal stertor may arise simply from venous engorgement at the base of the brain, in consequence of the suffocative stertor damming the jugulars.

Authors have always looked upon this symptom as an extremely dangerous one; and so no doubt it is, in the combined conditions of apoplexy and suffocation; but, as I have observed both it and nasal stertor, in a modified degree, in the snoring sleeper; and as cases of suffocative apoplexy, in which it has been most marked, sometimes make a rapid recovery, I withhold my opinion for the present.

Indeed, it is most impossible, from the writings of the past, to arrive at any conclusion as to the value of any symptom of apoplexy. We must now observe from a new point of view (apoplexy without suffocation), and draw our conclusions in the future. The following short case is a happy illustration of some of these remarks. I am indebted to Dr. Lewis of Folkestone for the notes.

*Case* 3. A lady, sixty-seven years of age, was found in her bed in an apoplectic condition. There was total loss of consciousness; the pupils were of about the usual size, but fixed; there was slight reflex action on touching the eyeball, and an occasional involuntary movement of the arms. The face was turgid, and there was both *pharyngeal* and *buccal* stertor. On being placed on her side, the stertor instantly ceased, and she gradually improved. In twelve hours, she had perfectly recovered consciousness; the respiration was normal; the face very pale, and the pulse quick and feeble; and there was no paralysis.

Surely no case could have looked more unpromising than this, when the age is taken into consideration.

*Nasal* stertor is unaffected by the position of the body, but may always be relieved by mechanical means.

*Palatine* stertor is usually of the least consequence; *i.e.*, it obstructs the breathing only very partially, and cannot always

be removed by changing the position of the body. It is affected by the size of the tongue, the length of the uvula, the position of the chin, and other incidental conditions, all of which may be obviated if the obstruction to the breathing be sufficient to render it worth the doing.

*Pharyngeal* stertor is the most common, in severe cases of apoplexy, when patients are recumbent. This may always be obviated by properly arranging the position of the patient; allowing the paralysed mass—the tongue—to gravitate to one side, rather than against the back of the pharynx.

*Mucous* stertor, when unconnected with long-engorgement, the consequence of suffocation from stertor, only occurs in very serious cases, depending upon interference with the nutritive processes of the lung-tissues—probably arising remotely from accident to, or pressure upon, the medulla oblongata. This can always be satisfactorily removed by proper attention to the position of the body.

These principles apply not merely to apoplexy, but also to all apoplectic conditions. Especially I would mention drowning, epilepsy, convulsions in children, meningitis with effusion, death-rattles, fracture of the skull, concussion, bronchitis, (especially that of old people), sudden œdema of the lungs, large hemorrhage from the lungs, great exhaustion, chloroform-poisoning, drunkenness, opium-poisoning, and all conditions in in which mucus or fluid exists in the lungs; and also all conditions allied to the apoplectic, whether there be mucus or not.

I have seen and treated all these conditions, and invariably with a similar result—an unfailing relief to the distressing symptoms and their consequences; and in many instances, both in my own as well as in the practice of my friends, ultimate recovery has occurred in cases which must, we believe, have terminated fatally if the obstruction to the breathing had been allowed to continue unrelieved.—*British Medical Journal, May* 28, 1881, *p.* 845.

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## 20.—CASE ILLUSTRATING THE INFLUENCE OF NITRO-GLYCERINE IN ANGINA PECTORIS.

By Dr. M'Call Anderson, Professor of Clinical Medicine in the University of Glasgow.

The following case of Angina Pectoris illustrates the influence of nitro-glycerine in subduing and preventing the recurrence of the paroxysms. The preparation used on this and other occasions was a one per cent. solution in spirit. My experience, so far, of the comparative merits of nitrite of amyl and nitro-glycerine is, that while the latter acts more slowly—

several minutes elapsing before its influence is fully felt—it seems to be more permanently beneficial.

Mr. M. came to me in the month of February 1880, on account of pain in the epigastric region. He is a married man, 46 years of age, a postmaster, and seems to have generally enjoyed fairly good health, until a little more than a year ago, when he began to observe that, when he walked fast, he felt something wrong about the lower end of the sternum, which he says "was neither a dull nor an acute pain, but something between the two." He imitated the sensation by taking my hand gently and gradually increasing the pressure until he grasped it very tightly indeed. This uneasiness only occurred when he exerted himself, especially after food, and became so commanding that he had to stop walking, but in about a minute it passed off and he was able to proceed again for a time, when it recurred. These symptoms have been becoming worse of late, so much so, that in going up a stair, which he had previously been able to do with perfect comfort, he has had to stop three or four times.

He was supposed to be labouring under disease of the stomach, and was treated accordingly. A careful examination, however, failed to show any stomach symptoms, although he occasionally vomited a mouthful of food, when he had bronchitis, to which he seems to have been subject during the winter months for some years. On the other hand, an examination of the circulatory system pointed to a weak, probably fatty, heart. The heart was not decidedly increased in size, but its apex beat could not be felt even when he lay upon his left side. The sounds were feeble and toneless, and the pulse, though pretty regular, was only 52 per minute.

I had no doubt that the pain referred to was of the nature of angina pectoris, and determined to try the effect of the internal administration of nitro-glycerine, for which purpose he was admitted into the Private Hospital in Renfrew Street on March 19, 1880. The initial dose was one drop of the one per cent. solution three times a day, which was gradually increased until he took as much as fifteen drops six times a day, and with no inconvenience, except that for half-an-hour after each dose he complained of some fulness in the head, and of headache. It was soon found, however, that his symptoms were sufficiently controlled by ten drops three times a day. Before the treatment was commenced he could never walk more than 300 yards without pain, but when he left the hospital on April 9, he could walk at least half-a-mile at an easy pace on the level without discomfort, and when the pain began to make its appearance he could put a stop to it at once, and continue walking, by swallowing a dose of ten drops.

I saw him again on May 10, when I found him in at least as satisfactory a state as when he left the hospital. His pulse was 60 and of better strength, and the sounds of the heart were stronger. He told me that he had found that three drops was then a sufficiently large dose of the nitro-glycerine to keep the angina symptoms in abeyance.—*Glasgow Medical Journal, July* 1881, *p.* 33.

## DISEASES OF THE ORGANS OF RESPIRATION.

### 21.—ETIOLOGY OF MILIARY TUBERCULOSIS.

By E. KLEIN, M.D., F.R.S., Lecturer on Histology and Embryology in the Medical School of St. Bartholomew's Hospital.

Evidence that tuberculosis is communicable from one human being to another.

(*a*) Tuberculosis may be inherited. Although inheritance is not a distinguishing character of infectious diseases,—being an endowment common to all living matter, and being specially noticeable in certain morbid states altogether distinct from infectious diseases, *e.g.*—cerebral abnormalties, cancer, gout, &c., are notoriously capable of being inherited—yet associated with other characters distinguishing a specific disease, inheritance has nevertheless a certain value, even if only an indirect one.

Thus, as regards cancer, rheumatism, or gout, there exists no definite evidence to show that these diseases are related to the infectious diseases, and, therefore, the fact of their being capable of inheritance cannot in any way be used as such evidence. The case assumes a different aspect, however, if we consider inheritance in relation to a notoriously infectious disease, such as syphilis. Here we find that inheritance plays an important *rôle* in the propagation of the disease. Similarly in the case of bovine tuberculosis (Perlsucht), there is sufficient evidence to show (Gerlach, Semmer, and others) that inheritance is also an important feature.

Virchow considers that tuberculosis may be inherited, not as such, but merely as a certain predisposition, as an hereditary vulnerability of the tissues, in consequence of which tuberculosis may be acquired on a suitable occasion.

Niemeyer, on the other hand, while admitting an hereditary predisposition towards pulmonary phthisis, questions not only the inheritance, but also the inherited predisposition of the tissues towards tuberculosis.

C. J. B. Williams, and others, likewise accept an hereditary predisposition, consisting in a greater delicacy and vulnerability of the tissues.

If it should be definitely established that miliary tuberculosis is a specific infectious disease, and we hope to show that it is so, then the inheritance of tuberculosis assumes a different aspect from what is represented by the authors just quoted, inasmuch as this so-called delicacy and vulnerability of the tissues is neither more nor less than a secondary and accidental condition, the specific *materies morbi*, or virus of tuberculosis, being the primary or essential thing. The exhalations of bad drains are not alone sufficient to produce typhoid fever, but typhoid germs accidentally present at one time or another in the drains may give to those exhalations a specific power.

We know nothing of the incubation period of tuberculosis, and whether or not an individual inheriting the germs of that disease from one of his parents, shows in consequence of it the symptoms of tuberculosis in childhood or at a later period of life, is a point not yet solved. If it is possible for a child to inherit syphilis and yet not to show the first symptoms of it before two or three years of age, I do not see why the same should not be possible also in regard to the meningeal tuberculosis of children.

(*b*) Tuberculosis is acquired in various ways :—

Firstly, it may be communicated from husband to wife, or *vice versâ*. The evidence on this point is rather conflicting, inasmuch as there are a good many assertions denying such a communicability; but as in other conditions, so also here, one well authenticated positive case outweighs all the negative ones. While Gubler, Drysdale, Guérin, Bouley, and Villemin cite cases to show the communicability of tuberculosis from husband to wife, and *vice versâ*, Cotton, Pidoux, Roche, and others deny such communicability. Guérin mentions the case of a man who, suffering from tuberculosis, infected his wife with this disease; the man dies and his widow marries again. She, having communicated the disease to her second husband, died; this man marries again, and communicates the malady to his second wife.

Villemin obtained an account of the following cases :—

(*a*) A man, in perfect health, marries a tuberculous woman. She dies and he marries again. He dies, and soon after him his second wife also from tuberculosis.

(*b*) A healthy man marries a phthisical woman. She dies in one year, and he in two years and a half from tuberculosis.

(*c*) A man loses by death, in consequence of phthisis, the first, second, and third wife, all of whom have been perfectly healthy before marriage. The man ultimately also dies from phthisis.

Dr. Hermann Weber's case, published in the Clinical Society's Transactions, 1874, is so well authenticated and clear, that it alone furnishes most valuable evidence in favour of the communicability of tuberculosis from husband to wife.

Dr. Bruhl, in a paper read before the Cincinnati Medical Society, mentions that he had more than a dozen times observed the transmission of tuberculosis from husband to wife, and *vice versâ*.

Secondly, from a patient to the attendant, or *vice versâ*.

Cotton did not notice any evidence of transmissibility of tuberculosis from the patients in the Brompton Consumptive Hospital to the attendants.

Dr. Bruhl, however, observed a case of communication of tuberculosis from patient to attendant.

Dr. Hubert Reich observed "in the village of Neuenburg, situated on a high bluff of the Rhine, and enjoying excellent hygienic conditions, from July 11, 1875, till Sept. 29, 1876, ten deaths from tubercular meningitis in children, born between April 4, 1875, and May 10, 1876. No hereditary disposition could be established. All these children were attended by the same midwife, suffering from lung disease (caverns and sanio-purulent sputa). She died July 23, 1876. She had the bad habit, when a child was born, of removing the phlegm from the respiratory passages by aspiration with her mouth, and, in slight cases of asphyxia, of blowing air into the child's mouth."

In connection with this section must be mentioned the spread of infection, within the same individual, from one organ to another. Virchow maintained that tuberculosis spreads from organ to organ, as if by infection. Cohnheim, in a remarkable article to be quoted below, has put together, with his wonted clearness, all that can be said on this point. The tubercular virus enters the organism most commonly through the air passages, and thus, in the first instance, is capable of favouring pulmonary tuberculosis, in some rarer instances "primary laryngeal tuberculosis." From here it spreads on to the bronchial glands, and further enters the general system, or by swallowing of tuberculous sputa produces secondary tuberculosis in the intestines, mesenteric glands, &c. Or the virus enters primarily through the digestive organs with the food, notably the intestine, and from here the infection spreads on to the mesenteric glands, peritoneum, and further, the general system. Or the virus attacks the urogenital organs. Cohnheim thinks it quite possible that a woman suffering from uterine tuberculosis may, *per coitum*, produce tuberculosis of the male urethra, which further spreads along the male urinary organs. But, in the majority of cases of tuberculosis of the urinary organs, the virus is excreted by the kidneys like other matter circulating in the juices. On its passage from the kidneys outwards, the virus may produce infection at any point where it has time to adhere, *e. g.* in the pyramids of the kidney, in the pelvis, in the ureters, bladder, prostate, ejaculatory ducts, seminal vesicles,

vas deferens, epididymis, and testis. In the female the passage of the tubercular virus from the peritoneum on to the mucous membrane of the oviduct, and further, of the uterus, is of great importance in interpreting the tuberculosis of these two last-named organs.

According to Cohnheim, the spread of the tubercular virus from the upper nasal cavity through the cribrous lamina of the ethmoid bone on to the pia mater, is of very great importance. This is especially noteworthy in the case of the meningeal tuberculosis of children, in whom occasionally no tubercles of the lungs or glands are to be found. Of course tuberculosis of the various organs may be also due to a general infection, *i.e.* metastatic tubercle, after the virus has entered the general circulation.

Evidence as regards the nature of the *materies morbi*.

Bruhl was the first to maintain a causal relation between caseous matter and miliary tuberculosis, inasmuch as he regards miliary tuberculosis as a specific infectious disease due to the absorption of matter from a caseous focus. So also Hoffmann, and many other subsequent observers. This dependence of miliary tuberculosis on caseous matter received a great deal of support, as has been pointed out on former pages, from the production by inoculation with caseous (tubercular and non-tubercular) matter, and with indifferent substances leading to caseous inflammation, in rabbits and guinea-pigs, of artificial miliary tuberculosis, or what resembles it. But, as was subsequently proved by Cohnheim and Salomonsen, and by Baumgarten, for the production of miliary tuberculosis of the iris with subsequent general tuberculosis in rabbits (compare also Tappeiner's inhalation tuberculosis in dogs), real tubercles (grey or caseous), must be employed, other non-tubercular matter, caseous or catarrhal, not producing any effect. It follows, then, that the *materies morbi* is present in the grey tubercle, and is not present in all and every caseous matter, but only in that derived from real tubercles. It has been mentioned on a previous page, as regards the bovine tuberculosis, that the *materies morbi* has been proved to be present not only in the tubercles, but also in the blood, milk, and flesh, but whether, in the case of human tuberculosis, the *materies morbi* is contained in the blood, milk, flesh, and other tissues, as well as in the tubercular matter, there is not yet sufficient evidence to show. If it should be proved that miliary tuberculosis is inherited as such from the parent, a transmission of the *materies morbi* through the seminal fluid or the ovum, as is the case in syphilis, would have to be accepted. The cases of transmission from husband to wife, mentioned in the beginning of this paper, do not indicate, as they have been thought to do, a transmission of the disease by the husband to

the wife through the spermatic fluid, for a transmission through the respiratory organs is here not excluded, and moreover appears very much more probable, bearing in mind the account of the transmission of the disease by the mid-wife mentioned by Dr. Reich. Klebs and Schüller assert that minute micrococci occur constantly in tubercular matter, and that they represent the *materies morbi* (Klebs' monas tuberculosum); by artificial cultivation, Klebs maintains that he has obtained this monas tuberculosum in a pure state, and that it produced tuberculosis when inoculated into animals.

Quite recently Dr. Deutschmann, in a series of no doubt quite reliable experiments, while confirming that human tubercular pus contains minute micrococci, similar to those observed by Klebs and Schüller, arrived at the following highly interesting and important conclusions:—When using for inoculation (into the anterior eye-chamber of rabbits) the clear serum of human tubercular pus, which had been allowed to separate from the solids by subsidence, no result, *i.e.*, no iris tuberculosis followed; while the sediment (pus corpuscles, detritus, and micrococci) produced after the usual incubation (sixteen to twenty days) distinct iris-tuberculosis; aqueous humor of the eye of a rabbit (inoculated), whose iris shows the commencement of iris-tuberculosis, and whose aqueous humor contains the above-mentioned micrococci (monas tuberculosum of Klebs) and pus corpuscles, but no caseous detritus, does *not* produce iris-tuberculosis when introduced into the eye-chamber of a healthy rabbit; the experiment is, however, successful, if the aqueous humor is derived from an eye, in which the tubercles of the iris have began to undergo caseous degeneration, and consequently the aqueous humor contains, besides micrococci and pus corpuscles, also caseous detritus.—*Practitioner, August* 1881, *p.* 82.

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## 22.—ON THE TREATMENT OF CONSUMPTION.

By Robert Saundby, M.D. Edin., M.R.C.P., and Assistant Physician to the General Hospital, Birmingham.

There is in my opinion no class of chronic disease in which well adapted therapeutic means do more good than Consumption, and it is therefore to me a specially interesting clinical study.

I agree with the great bulk of the profession in recognising the potency of the strumous constitution as a predisposing cause of consumption. I believe it to be often hereditary, but more often acquired, and I think in some rare cases it may be acquired by direct infection. I define tubercle as a grey miliary granulation, and cannot admit that it has any characteris-

tic histological elements, or that the lungs in phthisis present histological appearances differing from what might be produced by inflammation alone. But I do not think we can pretend to decide as to the specific nature of a morbid process by the microscope alone, and though the inoculation experiments have been contradictory, yet the balance of evidence, and especially of later experimenters, has been in favour of the view that tubercle does result from a specific virus.

It is noteworthy that the modern view as to the dependence of diseases upon the presence of micro-organisms, which by their growth and development either destroy the tissues or develop poisons which act injuriously upon the organism into which they have obtained entrance, brings out into relief, by its necessary postulates, the old doctrine of predisposition. By the hypothesis, the germ theory requires the presence of innumerable germs capable of developing under suitable conditions, and in the case of those contained in the air or in ordinary drinking-water, we must assume that they are introduced into thousands of bodies in which the suitable conditions for their development, *i.e.*, the predisposition, does not exist. Supposing therefore that the tubercle germ is a common inhabitant of our atmosphere, some other factor is necessary to favour its development, a condition which may be present in the strumous constitution, or in the debility produced by various constitutional states.

If, for the moment assuming the doctrine of the specific nature of consumption to be proved, we inquire what consequences would on *à priori* grounds follow in our method of treatment, we find them to be:—(1) to hinder directly, if possible, the development of the disease germs; (2) to use all the means in our power to increase the resistance of the organism.

This may be called the specific treatment of consumption, and may be fairly held to include much that is ordinarily practised, and must be distinguished from the no less necessary part of the management of these cases, viz., the symptomatic treatment.

The success of Antiseptic Surgery has not unnaturally given rise to hopes that similar good results might possibly be obtained by the application of the same principle to other than surgical diseases; but hitherto little success has attended these attempts—a result which cannot have astonished those who are familiar with the extreme care and the absolute necessity for complete control of all the conditions which are essential to the success of antiseptic surgery.

Of late several attempts have been made to apply the antiseptic system to the treatment of phthisis, the most prominent

of which was that of Prof. Rokitansky by the inhalation of sodium benzoate. Unfortunately the success he obtained did not follow the same treatment in the hands of others, and the plan has fallen into complete discredit, though various attempts are being made from time to time to revive it.

It is impossible to share in the sanguine anticipations of those who hope to find a cure for pulmonary phthisis in some more perfect form of inhaler or antiseptic. The success which has attended antiseptic surgery is the greatest argument against such a hope. We know that, under antiseptic precautions, a joint may be opened or large wounds may heal without any suppuration, or any fever. But when, unfortunately, the subject of the surgical operation is of a strumous constitution, and especially where the disease for which the operation is being performed is of a strumous nature, the employment of the most careful antiseptics will not prevent suppuration and fever, while the wound may refuse to heal, and the surgeon be compelled to resort to cod-liver oil and sea air before he can induce a healthy action in the strictly antiseptic wound.

If this is so of surgical lesions which are so completely under control, how can we reasonably expect better results in treating ulcerating surfaces in the lung, which can be only reached indirectly, and from which it is impossible with all our precautions to carry out strictly the principles of the antiseptic system. It has been proposed that the patient should wear a naso-oral antiseptic respirator continuously, and in this way it is conceived the access of germs would be reduced to a minimum. But the whole essence of Prof. Lister's teaching is, that it is absolutely essential to exclude living germs *altogether*, and that once they have obtained a foothold in a wound the strongest antiseptics may fail to dislodge them. The main strength of the antiseptic system is in the *prevention* of putrefaction or germ development, and where this is impossible its results are by no means satisfactory. But in the lungs of consumptive patients we have the process fully developed, and all we can hope to do by antiseptic inhalations is to hinder, to some extent, the otherwise unrestrained processes of putrefaction and destruction of tissue.

Even the most complete means we can devise come very far short in their efficiency of those readily employed by the surgeon in the treatment, let us say, of a diseased hip-joint which has opened spontaneously. Yet surgeons have found that antiseptics in such a case do not by any means act with success in a degree comparable with what is seen in healthy constitutions, and especially in wounds kept antiseptic from the first. Certainly no surgeon has ever pretended that carbolic acid, or

any other antiseptic, is a specific for the treatment of tubercular surgical affections.

I cannot think therefore that there is good ground for the somewhat large claims made by some of its supporters for the practice of continuous inhalation; and I think we are not justified in imposing upon our patients a very irksome and disagreeable procedure which affords so little reasonable ground for hope in its success.

But while I must condemn the theory and practice of continuous antiseptic inhalation, I have no desire to depreciate the value of antiseptic inhalations; but these cannot be regarded as any form of specific treatment, but as adjuncts to the ordinary symptomatic treatment of the disease.

Most of our consumptive patients when they first come under treatment are suffering from more or less bronchitis, which it is in our power to cure, and thereby cause very great improvement in their general well-being.

The principles that must guide us are those which would be applicable in ordinary cases of simple bronchitis of catarrhal origin. In most cases rest in bed is either necessary or very desirable until the condition is alleviated. The diet should be unstimulating, and the quinine and cod-liver oil, &c., should be stopped for the time. The treatment must be regulated according to the severity of the attack. In milder cases camphor, in severer cases turpentine, forms the principal remedial agent, given by means of inhalation, or applied to the skin. For this purpose camphor may be inhaled as before described, by putting a lump of it into a Maw's inhaler, or a jug with boiling water, or ten drops of turpentine may be substituted for the camphor. I generally prefer turpentine, but where this causes irritation camphor may be used. Externally the chest may be rubbed with linimentum camphoræ, linimentum terebinthinæ aceticum, or in more severe cases a waistcoat should be made of spongiopiline, fastening by means of tape shoulder-straps and tapes to tie in front, and this should be worn constantly and kept wrung out of hot water and sprinkled with a few drops of turpentine. This waistcoat has the advantage, in addition to its counter-irritant effect to the chest, of keeping the patient in an atmosphere of steam and turpentine most likely to soothe the irritable condition of his bronchial tubes.

The advantages of turpentine in the treatment of bronchitic affections are not sufficiently appreciated. Rich sufferers go to live in the pine-woods of Arcachon with benefit, but the homely application of common spirits of turpentine is not supposed to be equally effective.

Next in importance to turpentine is sulphur; the older physicians called it balsamum pectoris, and Graves tells us that

Hoffmann was in the habit of adding it to all his cough prescriptions in all cases of chronic cough in the aged and debilitated, and he himself expressed the opinion that five or ten grains of sulphur taken three or four times a day is one of the best remedies that can be prescribed in cases of chronic cough with constitutional debility and copious bronchial secretion.

The value of the various sulphurous mineral waters in the treatment of bronchitic affections is well recognised, and their sources are crowded by bronchitic patients; but here again the obvious application seems to have been missed, and sulphur finds its place in our pharmacopœia, mainly as a remedy for itch.

Finally, I usually order an ordinary stimulant expectorant of tincture of squill, carbonate of ammonia, and senega.

*Profuse purulent Expectoration.*—Under this head I propose to deal with the treatment of profuse purulent expectoration such as is secreted from the ulcerated surfaces of cavities or the chronically inflamed bronchial mucous membranes. It is especially in this condition that we find the truth of Bennett's statement that good feeding and cod-liver oil are better means to check cough than any mixtures of ipecacuanha and squill. Good nourishment and attention to the digestive organs are most important. But with respect to drugs, the most valuable is iron. Again to quote Graves, "the action of a chalybeate is not merely limited to strengthen the tone of the stomach and general system; it is also well calculated to arrest the superabundant secretion from mucous surfaces in many chronic fluxes, and hence its utility in gleet, diarrhœa, and chronic bronchitis." The best preparation for this purpose is the sulphate of iron, of which fifteen to twenty grains should be given daily, either in mixture or pill.

Here however is the place to speak of the use of antiseptic inhalations. This method of treatment was first advocated by Dr. Roberts of Manchester, and recently my friend Dr. Sinclair Coghill, of the National Hospital for Consumption at Ventnor, has published some very satisfactory results with an apparatus somewhat like Dr. Roberts's, but made by Messrs. Maw and Thompson.

The inhalers I employ are made for me by Mr. Best, the very ingenious and obliging instrument-maker to the General Hospital. They may be obtained to cover the mouth only or the mouth and nose; my cases have all been supplied with the latter. The advantage claimed by them over that of Dr. Roberts is a somewhat better shape, more easily adapting itself to the face, and the nosepiece. The defect of Maw and Thompson's inhaler is that it is perforated with such fine holes

that respiration is unnecessarily impeded, and the apparatus becomes hot and fatiguing, besides, the pewter of which it is made soon discolours and, being soft, gets out of shape. The cavity of the inhaler is filled with loosely-packed tow, which is used to absorb the medicament desired to be inhaled. My own experience has been with carbolic acid and oil of eucalyptus only, but others use compound formulæ; of these two I prefer the oil of eucalyptus. In using carbolic acid I have ordered a solution of one to twenty strength, and have ordered the tow to be wetted with it; with eucalyptus oil I have ordered ten drops to be put on the tow twice a day.

There is no rational ground for believing that antiseptic inhalations can be regarded as likely to effect cures. I have used them in a large number of cases, and have not yet seen any cures result; but the patients found great relief from their use. They readily take to the use of the inhalers, make no complaints as a rule, and the objective results are mainly in checking the purulent secretion and allaying the cough.

One of the greatest therapeutic advances in the treatment of conditions in which the stomach is unable to perform its functions properly, has been made by Dr. Roberts in his instructions to the profession how to prepare peptonised foods. By the use of peptonised milk, gruel and beef tea, prepared by means of Benger's Liquor pancreaticus, sold with full directions for use by Messrs. Mottershead of Manchester, nutrition may be maintained and the stomach have time to regain its wonted powers of digestion.

The various malt extracts, of which "Kepler's," sold by Messrs. Burroughs, Welcome, and Co., is in my opinion the best, are also very valuable means of attaining the same end. Malt extracts are chiefly composed of malt sugar, containing a large amount of the diastatic or amylolytic ferment of malt. If taken alone the maltose they contain is highly nutritious, but if mixed with starchy food, they aid the conversion of the starch into maltose, the physiological process of the digestion of starch, which is normally effected by the secretions of the salivary glands and the pancreas, but which in debilitated states is not duly performed.

"Hoff's Malt Extract" is an old preparation which has been lately reintroduced. It is a fluid, something like stout, only unfortunately very much less palatable. It tastes like a mixture of London porter, sugar, and liquorice, and this constitutes the great objection to its employment, as it possesses valuable nutritive properties.

I have said nothing about the prepared peptones, such as Darby's fluid meat, Peptone Defresne, &c., because they are, to my mind, superseded by the methods of Dr. Roberts. But

where it is desired to purchase ready-prepared peptone I would recommend Peptone Defresne (2, Rue des Lombards, Paris), as a pure and very palatable solution of peptone.

Cod-liver oil often has to be temporarily suspended for gastric irritability, but we must regard it as one of the most potent means we possess of building up the patient's strength, and therefore as a promoter of appetite. The reason why cod-liver oil is so readily assimilated is suggested by some of the more recent physiological investigations. The two known factors which favour the absorption of fats are the presence of bile and fatty acids; as cod oil is obtained from the liver of the fish it probably contains bile acids, and as it is generally slightly rancid, it also contains some fatty acids; hence its ready absorption.

Where patients experience any difficulty in taking the oil, the plan originally suggested by Dr. B. W. Foster, of giving ten drops of sulphuric ether, with the oil, or twenty minutes before its administration, is often successful.

The various emulsions recently introduced are also useful as presenting the oil in a palatable form, but they have the disadvantages that so much more must be taken to get the required dose, and that of expense, for when taken in large quantities the cost becomes of some moment.—*Practitioner*, *Oct.* 1881, *p.* 249.

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## 23.—ON ANTISEPTIC INHALATION IN PULMONARY AFFECTIONS.

By J. G. Sinclair Coghill, M.D., F.R.C.P.Ed., Physician to the Royal National Hospital for Consumption.

[The subject of the following paper is the inhalation of antiseptic materials in the treatment of such stages of phthisical pneumonic and bronchial affections as are accompanied by purulent or fœtid expectoration.]

In adopting local antiseptic medication in the treatment of pulmonary disease, medicine is but adding another to the many acknowledgments of the splendid success of Professor Lister's antiseptic methods in the sister domain of surgery. Lister's invaluable researches in physiological therapeutics seem, indeed, capable of indefinite extension. To us, as physicians, his doctrines are especially valuable, as shedding new light on the importance, locally and constitutionally, of the lesion of the lung in phthisis, as well as unmistakably indicating a most appropriate means of treatment. Already, antiseptic inhalation can no longer be regarded as a novelty in pulmonary therapeutics. It would be almost invidious to name in this connection the many distinguished physicians

who have recognised the important bearing of the antiseptic views of Lister on the pathological relations of suppurative processes in the lungs, and their treatment. Dr. W. Roberts, of Manchester, very early took up the subject; and he has been followed, in rapid succession, among others, by Drs. James E. Pollock, Douglas Powell, Thorowgood, Dobell, Clifford Allbutt, Sansom, Burney Yeo, and many others.

Antiseptic inhalation, indeed, is evidently and deservedly coming into notice, as a valuable aid in the treatment of a large and important class of diseases; and I believe that it is capable of much greater development and extension, and that it will ultimately play a distinguished *rôle* in the pulmonary therapeutics of the future. It must, however, be admitted that it has not been adopted as rapidly or as generally as the undoubted indications for its employment would seem to justify. It is somewhat difficult to account for this tardy recognition of means that have been found so valuable in the hands of those physicians who have put it to the test of long and extensive trial.

The propriety of attacking disease in the local seats of its activity, in addition to treating the constitutional conditions which accompany—not necessarily in the relation of cause and effect—the local lesion, is one which, in the present state of pathological knowledge, hardly admits of question. If this be accepted as a leading principle in the therapeutics of disease in general, how much more readily should its application be recognised in the treatment of affections like those included in the common term of phthisis, where the relation of the tissue-lesion to the constitutional morbid state is not accidental or variable, as it is in many other maladies, but essential and continuous; and where, consequently, their reactions on each other are of primary importance. In the advanced progressive forms of tubercular phthisis, the fever which accompanies the breaking down of the infiltrated and disintegrated pulmonary tissue has long been recognised as an infectious pyrexia, directly resulting from the absorption of the septic materials from the seat of this retrograde metamorphosis. In pneumonic or secondary phthisis, also, we have a suppurative process set up as a retrograde sequel to the original inflammation of the lung-tissue, ending in an excavation, which is in all essential conditions analogous to a surgical abscess. The natural progress of the two local states—the excavation in the lung and the external abscess, as well as their influence on the general condition, are identical. In both, we have a localised suppurative process, continually invading and breaking down the adjacent sound tissues; exhausting the patient in proportion to the amount of pus thus secreted,

forming active centres of disseminating infection, and lowering the powers of the patient by the resulting febrile movement, thus still further diminishing his chances of recovery. But this morbid process is capable of arrest—nay, as the great Laënnec first pointed out, and as all our *post-mortem* experience amply corroborates—nature herself is equal to the task; but it is none the less the duty of the physician to come to her aid with all the means in his power. In such circumstances, the objects of treatment are, as Dr. Douglas Powell states, in his admirable Lectures on Excavation of the Lung in Phthisis (Lancet, August 1877):—1. To lessen secretion; 2. to promote evacuation of what secretion is formed; 3. to disinfect the air which may pass into surrounding or deeper healthy portions of the lungs. Again, he says: "besides acting as disinfectants, antiseptic inhalations promote expectoration by increased energy of expiratory acts." Dr. Burney Yeo also recommends antiseptic inhalations, "if they have only the effect of temporarily cleansing, as it were, the pulmonary surface. It is a process analogous to that of washing away the decomposing discharges of a foul superficial ulcer." Dr. Clifford Allbutt has broadly stated, and as truthfully, that "most phthisical patients die of septicæmia; and the arrest of this daily re-poisoning is a primary object of treatment." Antiseptic inhalation again assumes a still more important position, if the latest pathological theory of the contagiousness of phthisis through the respired air be well founded.

Why, then, should we, as physicians, not recognise that, in all suppurative processes in the lungs, as evidenced by purulent expectoration, we have local conditions presented, calling as loudly for direct antiseptic medication as the wounds, abscesses, and ulcerations which belong to the province of our surgical brethren? But, while the external or surgical employment of antiseptics is an easy and simple process, and its results more immediately apparent, it is very different when we have to introduce our remedies into the interior of the body through an intricate and jealously guarded portal, as we have in the case of the lungs. That the comparative accessibility, however, of the lungs, through the glottis, should have, even in the earliest times, suggested direct medication, is not surprising; but it is, indeed, strange that inhalation, or taking advantage of the respiratory act for this purpose, which dates from the days of the Father of Medicine himself, should only have received, until comparatively recent times, but occasional and rare employment. That its importance was from time to time recognised, there is abundant evidence in the works of the older physicians; and, that this importance was even occasionally exaggerated by them, is shown by the statement of the celebrated Italian physician

Mascagni, who says: "if ever a specific should be devised against consumption, it would be such as to be introduced into the organism through the windpipe." A succession of celebrated names in more modern times, too numerous to mention, is associated with the subject of pulmonary medication by inhaling; and a great variety of apparatus, more or less elaborate, have been introduced from time to time for the purpose. There are, however, great objections, apart from the almost impossibility of their penetrating deeply enough into the tissue of the lungs, to the inhalation of dry powders, however finely divided, on account of their mechanically irritating effect on the often already morbidly sensitive laryngeal and bronchial surfaces. Non-volatile fluids, again, can only be very partial in their distribution; and, if inhaled at high temperature, must further render the upper reaches of the respiratory tract sodden, and increasingly sensitive to changes of temperature. Careful observation of the action and effects of this steaming process in affections of the lungs has convinced me, that it is not only inefficient, but, in every respect, positively injurious. It relaxes the tissues with which the vapour comes into contact; it encourages suppuration where the ulcerative process has begun, and it tends, therefore, to increase expectoration and cough, and consequently the distress and exhaustion of the patient. The inhalation of hot moist vapour, indeed, is so repugnant to the respiratory tract, that but a small quantity of the medicated material can penetrate sufficiently into the pulmonary tissue to be of use. The immediately subsequent effects are also not unattended with risk, from the exposure of the air-passages to air of a lower temperature after hot inhalation. However beneficial, then, in laryngeal affections (and we are all familiar enough with its value in such), the inhalation of dry powders, or of pulverised fluids in the form of spray, either cold or hot, may be, they cannot be regarded seriously in connection with the treatment of suppurative processes within the lung itself.

It is now more than five years since I became strongly impressed with the important bearings of Lister's teaching on the local treatment of phthisis; and, in working out the idea of antiseptic inhalation, the considerations above referred to, suggested the plan of adopting the principle of the old-fashioned, and now happily almost obsolete, respirator for the purpose—selecting a volatile medium for the antiseptic materials, and employing the breath in the alternate acts of inspiration and expiration, as their vehicle. These so-called antiseptic inhalers or respirators were first made to my order by a local tradesman, in common tin, of the exact shape and size of the ordinary metal respirator. These were, however, somewhat primi-

tive in style; and they have since been extensively made by Messrs. Maw, Son, and Thompson, in a more elaborate and convenient fashion.

The apparatus is extremely simple. It consists of a space for a pledget of tow or cotton-wool, enclosed between the perforated surface of the respirator and an inner perforated plate, which can be raised so as to permit the tow to be saturated with the antiseptic solution. Elastic loops are attached to pass over the ears, and retain it in position. The inhaler may be procured either plain or of a slightly smaller size, and covered with black cloth, for wearing out of doors. The pledget of tow, which may be changed once a week or so, should be sprinkled with from ten to twenty drops of the antiseptic solution, from a drop-stoppered phial, twice-a-day at least, according to the extent to which the inhaling may be carried on. Of this the patient is the best judge, and the length of time and quantity of solution should be regulated by tolerance and effect. The most important times for inhaling are for an hour or so before going to sleep at night, and after the morning expectoration, which leaves the suppurating surface or cavity dry to be acted upon—disinfected, so to speak—by the antiseptic vapour. A great many of my patients have of their own accord come to use the respirator almost continuously day and night, from their experience of its good effects. I attach the utmost importance to the mode in which the respiration is conducted while inhaling. The patient should be carefully instructed to inspire through the mouth alone, and expire through the nose. In this way, the breath is drawn through the saturated tow in the perforated chamber of the inhaler, and passes directly into the lungs laden with the antiseptic materials. Expiring through the nose only, necessarily involves a complete circulation of the medicated air. The breathing should be short at the beginning of the inhalation, but gradually deepened, so as to displace and affect the residual air in the more distant portions of the lungs. This form of respiration itself is not only of great use in favouring the circulation of the blood in the lungs, and thus aiding both local and general nutrition through that fluid, but it helps very much the expulsion of the sputa by means of the increased energy and thoroughness of the expiratory acts. Indeed, the great objection to the ordinary respirator lies in the shallowness and rapidity of breathing which it involves, in consequence of which the lungs, being imperfectly expanded and contracted during each act of respiration, become themselves literally fatigued, and the breath is drawn in and forced out so feebly, and at the same time so quickly, that there is not time for it to be dispersed into the fresh air, but it returns each time into the lungs only partially changed. The extremely fœtid

odour which the apparatus rapidly acquires is sufficient proof of this. One of the patients in the Royal National Hospital here, when I was working out this subject, made a pasteboard respirator for antiseptic inhalation of such a shape as to include the nose; but it was found to have all the objectionable points of the ordinary respirator, and certainly did not permit sufficiently free access of the medicated air to the lungs, a large amount of the antiseptic material being lost by absorption on the convoluted walls of the tortuous nasal channels.

After many trials of the now formidable list of antiseptics, I find that carbolic acid, creasote, and iodine, in combination with sulphuric ether and rectified spirits of wine, are the most efficacious and satisfactory. The want of volatility in boracic, salicylic, and benzoic acids, and their salts, proves a bar to their employment by this method. Dr. Horace Dobell, who has had a very favourable experience of this treatment, writes to me that he has found thymol, in the form of Shirley's thymoline, very grateful and efficient, in many cases, where the smell of carbolic acid and creasote was intolerable either to patients or to their friends. Of the three antiseptic agents I chiefly use, I find iodine most useful in the second stage of phthisis, when the expectoration is passing from the glairy into purulent character. I use a tincture, for inhaling purposes, made with sulphuric ether instead of spirits of wine; and this ethereal solution has a singularly soothing effect on the cough and pulmonary irritation. In combination also with carbolic acid as carbolised iodine, or iodide phenol, it is extremely useful in the purulent expectoration accompanying the resolution of pneumonia, both catarrhal and croupous. In the stage of excavation, whether tubercular or pneumonic, the combination of iodine with carbolic acid and creasote is most potent. The acid seems to have the greater influence in checking the amount and purulent nature of the sputa; while creasote acts more as a sedative in the cough, apparently by reducing the irritability of the pulmonary tissues. The addition, also, of varying proportions of sulphuric ether and chloroform greatly assists in soothing and allaying irritation. These combinations also act frequently like a charm in the profuse expectoration of purulent bronchitis, as also in bronchial asthma. Dr. Thorowgood, in the Lettsomian Lectures for 1879, describes my antiseptic respirator, and adds his valuable testimony to its efficacy in bronchial affections. I have also noticed that patients, while using this form of inhalation, frequently experience great relief from the aches and flying muscular pains which often occasion much distress in the advanced stages of phthisis.

In connection with these observations, the following formula may be taken as an adaptable basis for the antiseptic solution

for inhaling. ℞ Tincturæ iodi ethereales, acidi carbolic, āā ʒ ii; creasoti vel thymoli, ʒ i; spiritûs vini rect., ad ℥ i. M. Where cough is urgent, or breathing embarrassed, chloroform or sulphuric ether may be added at discretion. In the formula which I published in 1877, a small quantity of glycerine was introduced, with a view to aid solution and fix the materials; but I found it unnecessary, and also that it clogged the respirator, and soiled everything with which it came in contact.

Whether these substances act by destroying the germs to which the formation of pus is attributed by the great teacher of the antiseptic method, or by their abortive effect from a physical cause, such as coagulation, on the cell-proliferation in the seat of morbid action, I do not profess to know; but the effect of this antiseptic inhalation in diminishing expectoration, and with it the cough, in the various forms of phthisis, during the resolution of pneumonia and in the purulent stage of bronchitis, acute or chronic, with dilated bronchi and fœtid expectoration, is certainly most remarkable.—*British Medical Journal, May* 28, 1881, *p.* 841.

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## 24.—ACUTE PHTHISIS TREATED BY THE CONTINUOUS TOPICAL MEDICATION OF THE LUNGS.

By G. Hunter Mackenzie, M.D., Physician for Throat Diseases to the Western Dispensary, Edinburgh.

In a former communication (*Retrospect*, vol. lxxxiii, p. 82) I directed attention to the system of continuous topical medication of the lungs in phthisis, and showed how it might be successfully carried out by means of a respirator specially constructed for the purpose. I now wish to record in detail a case of acute phthisis which has been treated by this method with satisfactory results.

A. B—, male, aged eighteen, a lithographer in Edinburgh, consulted me in July 1879, complaining of general weakness, cough, and emaciation. Two brothers had died of phthisis, and there was a history of the same disease in his maternal relations. The patient had not suffered from any previous complaint. He had not lately had a cold, and he could assign no particular cause for his ill health. On examination, the pulse was quick and small (110); temperature 100·5°; respiration slightly hurried. The mouth and tongue were rather dry, the latter slightly furred. Beyond a slight roughening of the respiratory sounds, and prolonged expiration, there was nothing to be detected in the lungs. He was ordered cod-liver oil, with hypophosphites, abundance of milk, and residence in the country, for which he soon left. In October I was called to see him, and during that and the succeeding month he became rapidly worse.

The fever increased, an evening temperature of 103° being recorded, with a correspondingly quick pulse, shallow and hurried respiration, lips coated with sordes, thirst, and lividity of the extremities. The lungs now gave undoubted signs of disease. There was marked dulness over the upper third of the left lung anteriorly, with copious fine crepitation, racking cough, occasional bloody sputum, severe night sweats, and loss of hair. The general weakness increased to such an extent that the patient latterly could scarcely leave his bed without assistance. The treatment pursued in the first instance embraced the continued administration of cod-liver oil and hypophosphites, quinine and digitalis, maltine, &c., with the usual regulations as to diet and hygiene. At this time I had not the same facilities for making continuous observations as latterly, but there was no disputing the fact that the disease, in spite of the above and similar treatment, continued to make rapid and alarming headway. Under these circumstances, on Nov. 26, 1879, I commenced the system of topical medication. Marked improvement of the various symptoms soon followed. The subjoined charts indicate the thermometric range (the most precise gauge of the progress of phthisis) from Jan. 27 to July 12, 1880, with one or two intervals, when the observations, from some cause or other, were not made or recorded. During the period not embraced in the charts—Nov. 26, 1879, to Jan. 27, 1880—the patient also steadily, though slowly, improved.

The general results of the treatment so far were: (1) slight fall of temperature; (2) great diminution of the cough, with complete cessation of the muco-purulent sputum; (3) marked improvement in the appetite and general strength; (4) gradual abolition of the night sweats; (5) improvement in the physical condition of the lungs. To assist in determining the relationship between the particular method of treatment employed and the improvement in the patient's condition, I now discontinued the creasote and carbolic inhalations, with the following results.

Without the use of the respirator the patient decidedly relapsed. The temperature, as a rule, was higher, the cough and sputum returned, there was a renewed tendency to nocturnal sweating, and the patient expressed himself as not feeling nearly so well as when wearing the respirator. At his own desire he resumed the inhalations, and again most marked improvement followed.

The further history of this case is of interest. During the late severe winter the patient went about rather freely, and, contrary to my advice, abandoned altogether the creasote inhalations. The result was that about the beginning of the year he had a relapse, with a return of the cough, night sweats, and other symptoms, but not to the same extent as formerly, He now, of his own accord, resumed the use of the respirator.

and precisely the same results as on the two former occasions followed. When I had an opportunity of examining him, on March 8 last, the evening temperature was 98·9°; there was no cough, expectoration, or night sweating; the appetite was good, and the patient felt "very well." There was a scarcely appreciable dulness at the left apex anteriorly, with prolonged expiration at both apices, but no moist sounds were audible. He had slightly increased in weight. The patient was not by any means "the picture of perfect health," but he had a very different appearance from what he presented before commencing the use of the respirator.

*Remarks.*—There can be no doubt whatever that the success in this case was owing to the particular method of treatment employed—viz., causing the patient to respire as continuously as possible an "antiseptic" atmosphere. The result obtained would appear to bear out the experiments of Schüller of Greifswald, who found that animals rendered artificially tuberculous were cured by being made to inhale creasote water *for lengthened periods.* (The italics are mine.) Intermittent spraying or inhaling does not produce the same result. In order to ensure success the application to the lungs must be made *continuously.* For this purpose I have used various volatile antiseptics, such as creasote, carbolic acid, and thymol. The latter I have now discarded as being too irritating and inefficient. Carbolic acid seems to be absorbed, for it has been detected freely in the urine, in this and other cases where it was inhaled, by my friend and colleague Mr. Falconer King, lecturer on chemistry. Mr. King has been unable to find any trace of creasote in the urinary excretion after the use of creasote for several consecutive days. As absorption of the particular drug employed is not necessary, and therefore not to be desired, I now use creasote only, either pure or dissolved in one to three parts of rectified spirit. Whether the success so far attained is due to the antidotal action of creasote and carbolic acid on a specific tubercular neoplasm, or to their action as preventives of septic poisoning from the local centres in the lungs, it is certain that their continuous, steady use in the manner just described has a decidedly curative action in acute phthisis, and is therefore worthy of an extended trial.—*Lancet, May* 14, 1881, *p.* 775.

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## 25.—ON THE ANTISEPTIC TREATMENT OF PULMONARY PHTHISIS.

By W. Williams, M.D., M.R.C.P., Physician to the Royal Southern Hospital, Liverpool.

My object is to bring the principles of Professor Lister's antiseptic method to bear upon the treatment of cavity or

abscess of the lung. It is not so much, then, to the impregnation of the inspired air with vapour, as its purification, that I wish to draw attention.

Before entering upon the subject before me, I will make a very few remarks upon some of the pathological changes which lead up to the disease in question.

Unlike acute pneumonia, from which recovery is, in favourable cases, complete, chronic or subacute inflammation of the lungs, in whatever way it may arise—whether as the relic of a previous acute attack, or of an attack of catarrhal pneumonia, or as the result of embolic arrest in the pulmonary capillaries (a view of the causation of phthisis at present in some favour)—tends towards the changes in the lung which are the precursors of phthisis, or, at all events, of some of the more chronic varieties of this disease. Accompanying it are found the same histological changes that are associated with this process elsewhere—a migration of leucocytes takes place, to invade all the pulmonary structures; the bloodvessels are surrounded, compressed, and their efficiency as circulating channels is damaged; the smaller tubes are, in their turn, similarly affected; while the alveolar walls are themselves invaded, thickened, and suffer a loss of elasticity. These, the immediate effects of inflammation, are aggravated to the utmost when the inflammatory products undergo the ultimate connective tissue transformation, with subsequent contraction and consolidation. This change, however, except towards the circumference of the diseased spot is, we are taught, by no means that which invariably takes place; much more frequently, towards the centre of the patch, the tendency will be to suppuration and abscess, and the advent of this result will no doubt be hastened or postponed, according to whether the particular case has the acute or chronic characteristic most developed; but, an abscess once established, systematic infection, with rigors, fever, sweats, rapid wasting, and, what is of far greater importance, the setting up, by means of emboli disseminated by parts already affected, of foci of similar disease at a distance in the same, or in the opposite lung, are liable to take place. This is a mode of ingravescence which undoubtedly prevails, and, indeed, forms the principal features of most, if not all, cases of advanced phthisis; and that the study of it forms the surest guide to successful treatment is, I think, no isolated opinion. The patient, although he may have every possible attention—the best of nursing, the most nourishing of diets, given with the most approved regularity—cannot possibly derive the benefit which would, under more favourable circumstances, be secured him by such means, so long as suppurating cavities containing septic pus are allowed to exist in the lungs, constantly exercising their pernicious in-

fluence on the blood, preventing even the proper assimilation of the nourishment of which he stands in so much need.

The surgeon, with the resources at present under his command, has no difficulty in obviating the occurrence of the above untoward contingencies; and it will be my endeavour to show with what success I have been able to employ in the treatment of cavities in the lungs the means all but infallible in their application to external wounds.

It is a principle of treatment now universally recognised, that an abscess must be freed of its contents, kept empty by free drainage, and insulated or protected by antiseptic media from the septic influence of the surrounding atmosphere. These conditions being duly fulfilled, experience amply proves that any constitutional disturbance which has already appeared may very well be allowed to take care of itself, as under these circumstances the local lesion will quickly cease to be anything more than a local lesion.

Free drainages from abscesses or cavities in the lungs is undoubtedly in by far the majority of instances not to be secured; we know that they owe their most characteristic features of being rife sources of systemic infection, or septicæmia, to the fact of their contents being retained while exposed to the septic influence of the air breathed; and the partial discharge that does take place is but periodically produced by the compression which the lung experiences during coughing—a method of evacuation that suggests to one's mind an attempt being made to cure the abscess by squeezing out the contents instead of providing, in addition to antiseptic protection, an efficient opening for a spontaneous and thorough drainage. For this reason, it will appear that all the conditions favourable to the complete carrying out of the Listerian method do not ordinarily exist here. One essential to the system—free drainage—we have seen to be frequently absent; but while admitting the full significance of this fact, we are, I think, bound to confess that the condition which is applicable is scarcely the least important of the two. No one, for instance, would deny antiseptic protection to a suppurating cavity because he was unable to empty it; and simply for that reason, would not a suppuration cavity in such a state, and with the risk of septicæmia which especially attaches to such a state, rather call for this guard against by far the worst accident that can arise?

From the time when, more than two years ago, I first attempted to bring the antiseptic system to bear upon chronic phthisis, I have become more and more convinced that it is the only treatment which promises to fulfil all the requirements of these cases.

In the ordinary application of Professor Lister's system, the

fact is recognised that carbolic acid, except to rid the wound in the first instance of septic germs, is not a good application. So far as the raw surface is concerned, it is irritating; and to counteract this drawback a piece of prepared oiled silk as a protective is invariably placed underneath the carbolised pad. To a certain extent, air circulates through the covering of gauze; and air purified by the filtration which necessarily takes place is, therefore, in constant contact with the surface of the wound, and with the discharge which lubricates that surface. Have we not, I will ask, an exact parallel to this in the application of the same principle to the lungs? I believe we have, even to the preliminary cleansing of the foul surface alluded to.

Respiration ensures the circulation of air to perfection; while as it passes through the respirator it is not only purified, but it also becomes impregnated with a certain amount of the carbolic vapour given off by the gauze. The quantity inhaled of this vapour may, for any single inspiration, be quite insignificant; but when multiplied by the number of inspirations made in only a few hours, it does not seem difficult to believe that the amount would soon be sufficient to accomplish the disinfection of all the purulent cavities already in communication with bronchial tubes. That this end is actually gained, and even rapidly gained, my experience certainly tends to prove; and I find moreover that, on the disappearance of odour, it requires subsequently the presence of very little carbolic acid on the gauze to keep the expectoration permanently free from fœtor, as though the ulcerated surfaces having been rendered aseptic, all that remained to be done was to ensure against their reinfection by the inspiration of only pure air, and also to obviate the risk of creating irritation by breathing that which contains but a minimum quantity of suspended carbolic vapour.

So far as my observations go, they also tend to show that fœtid pus from the lungs is not so rich in bacteria as putrid matter from some other regions; and this may be the explanation of the facility with which odour disappears under this mode of treatment: there being but few organisms to kill, the work is soon completed.

Three of the six slides which I show to-day have been prepared from patients before, and the remainder after, treatment. You will observe that while they all contain micrococci, only the former show rod-bacteria. I have only been able to get these few specimens ready in time: that they must not be allowed to lend any support to the clinical facts, must be evident. The matter in each case was taken from recent expectoration, which was immediately dried, stained with methyl-aniline-violet, and mounted in Canada-balsam. Although the power employed—an eighth objective—is a comparatively low

one for the purpose, yet with the aid of Abbé's condenser the micro-organisms are very fairly shown.

With regard to the mechanism adopted, the following is a description of the kind of respirator I find to answer best. Over a wire frame-work, shaped like a respirator, made to cover both the mouth and nose, two or more layers of ordinary antiseptic gauze are stretched; along the concavity inside, a narrow strip of sponge is placed, and, finally, the whole is fitted accurately to the face by a circumferential pad made of gutta-percha tissue, stuffed with cotton-wool, or folded lint, which is more manageable. Antiseptic gauze in the dry state gives off a vapour of carbolic acid. Bearing in mind, however, the large amount of air that would in ordinary breathing pass to and fro, it will be very evident that this comparatively small piece of gauze must soon become exhausted, and require recharging; this is secured by the whole being dipped every half hour or so at first, afterwards less frequently, into a watery solution of carbolic acid of the strength of 1 in 40; the gauze is, besides, renewed every two or three days. These respirators or dressings are worn as constantly as possible; in fact, the only occasion on which their temporary removal is permitted are during a meal, for the purpose of expectorating, and for that of dipping. Taking into account the apparent inconvenience, it is a little surprising with what readiness even hospital patients fall into the way of wearing these appliances with the greatest constancy both day and night. It is quite the exception to hear complaints of any kind.

The following cases present a fair example of the results I have met with.

*Case* 1.—April 3, 1879. J. O., sailor, aged 19, had three months' illness, originating in exposure. There was consolidation, and a cavity affecting the left apex. He had purulent bronchitis throughout both lungs, very great emaciation, rigors, sweating, and diarrhœa. The temperature was 104° at night, and 99° in the morning. Expectoration amounted to thirty ounces in the twenty-four hours—purulent, and very offensive. On the seventh day from the commencement of the treatment, the cough and symptoms were generally much improved; expectoration ten ounces, and free from smell. At the end of four months he left the hospital for his native country (Norway) in much improved health; expectoration two to three ounces, mucoid.

*Case* 2.—December 8, 1879. J. P., joiner, aged 43, had had four months' illness, commencing with cough and repeated attacks of hæmoptysis; emaciation followed, with rigors and night-sweats. Percussion over the right apex showed dulness to exist as far down as the fourth rib; a large cavity was also

present here; coarse crepitation, with increased vocal resonance at the right base. The left lung was fairly healthy. The expectoration was five ounces in the twenty-four hours, nummular. The bowels were mostly loose; temperature 100°. He had frequent attacks of pain in the right chest.

December 18. Weight 9st. 11½lbs. He had slight hæmoptysis during the night.

January 8. Weight 10st. 2lb.; January 16, 10st. 7lb.; January 23, 10st. 9lb.

March 5. Weight 11st. 6lb.; so far as I could gather, his normal weight.

This patient was discharged cured on March 8, 1880. I have seen him up to the last three weeks; he continues free from relapse, though the cavity still exists, and he follows his employment.

*Case* 3.—November 7, 1880. W. C., a labourer, aged 19; height 6ft. 2in., weight 8st. 11lb., slight build; five months' illness. He first had a cough and pain in the chest; afterwards thick expectoration, occasional attacks of hæmoptysis, great wasting, sweating, &c. The thorax was flattened on the left side above; respiration here was cavernous, and accompanied by gurgling; pectoriloquy and cracked-pot percussion-note were marked; dulness extended all over the left front and upper third behind. The left lung contained several cavities. The heart was displaced upwards, and to the left. There was puerile breathing on the right side. Expectoration amounted to about six ounces, nummular, and occasionally very offensive. Temperature 104° at night, and sometimes a little higher. He was ordered a carbolised respirator.

He left the hospital, after four months' treatment, for the Convalescent Institution at Woolton. Expectoration was mucoid, a few drachms only; cavities dry. He had not had hæmoptysis for a month, and then only a slight tinge; weight 9st. 6lb. He was able to go about as usual. One day, a month ago, this patient called upon me, when I learnt that he had remained pretty free from cough, and was still improving. The condition of his chest seemed to be precisely what it was on his first leaving us.—*Brit. Med. Jour.*, *July* 23, 1881, *p.* 120.

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## 26.—ON THE LOCAL TREATMENT OF PHTHISIS BY CARBOLIC ACID.

By Robert Hamilton, F.R.C.S., Senior Surgeon, Royal Southern Hospital, Liverpool.

A paper which Dr. Williams lately read before the North Wales Branch of the British Medical Association [*vide* preceding article] draws attention to a mode of treatment of phthisis

which will prove extremely valuable, and will be more successful than any other in many allied diseases of the lungs.

The inhalation of carbolic acid vapour, in the continuous mode suggested by my colleague, meets with a difficulty which, I have always felt, has stood in the way of all previous methods of conveying drugs to the lungs. He utilises the carbolic gauze of Lister, and merely saturates it occasionally with an aqueous solution of the acid.

The old forms of inhalers, as well as the modern spray producers, necessitate a quantity of aqueous vapour being introduced into the bronchial tubes and into the air-cells, much in excess of what is ever naturally taken in. There is a positive evil in this, such vapour condensing, and being then deposited on the delicate epithelial lining of air-tubes and cells, interferes with the osmic movements which respiration induces. That respiration is practically impeded is shown by the coughing and the suffocating sensation produced, so that a very few minutes' use, at one time, of inhalers and vaporisers is all that is possible. The suspension put to natural processes is apt to be overlooked in our eagerness to get the drug brought into actual contact with diseased lung-tissue; and the evil produced by the water is far more than commensurate with the good that the drug can do.

The mode of conveyance of the minute particles of carbolic acid by Dr. Williams's respirator is not open to the above objection; and as the drug itself has been tested in surgical practice, and found to be of invaluable service in the treatment of all suppurating surfaces which are accessible, it is fair to infer that, if it can be applied *per se* to the lungs, it may be equally efficacious in checking the growth and development of morbific germs in them, and thus allow tissue to be reconstructed.

I have treated several cases of phthisis in the way suggested by Dr. Williams, with good results. The almost constant wearing of the respirator whilst under treatment may be an obstacle to the rapid adoption of the method; but it is, as he says, astonishing how soon the patients become accustomed to the wearing of them. They are only one degree more unsightly than the respirators which many people wear out of doors without hesitation. Further improvement in their shape and appearance is sure to follow, if their value be established.

I have desired to draw attention to this mode of treatment of phthisis, because it is following in the lines of thought in which surgical procedure has run for some time, with marked success. It approves itself to the views of those who uphold the germ theory of disease; and as an undoubted germicide, and nothing more when used in moderation, it carries out another great desideratum—non-interference with natural processes of nutrition and repair of material.—*Brit. Med. Jour.*, *July* 2, 1881, *p.* 10.

## 27.—ON THE TREATMENT OF LARYNGEAL PHTHISIS.

By Dr. MAURICE SCHMIDT, Frankfort-on-Maine.

Up to the present time the treatment has almost always been limited to relieving the sufferings of patients as much as possible.

The treatment which I prescribe contains nothing new, the free scarifications excepted. All the other remedies have already been employed by other physicians. The treatment is divided into two parts—the treatment of the lungs and that of the larynx. As to the first this is not the place to discuss it. My experience has shown me the superiority of non-medicinal treatment, physiological if you like.

I would like to say in a few words what this treatment is which I make my patients carry out.

(1) Constant residence in an atmosphere as pure as possible both day and night. I induce my patients to keep their windows open during summer or half-closed during winter. I send those who have means into the mountains, the forests, or to the country. I only make one exception, for patients attacked with an inflammation of the larynx, however slight, with whom the climate of the high Alps does not appear to me to agree.

(2) Exercise of the lungs, suited to the strength of each patient, to facilitate the expulsion of mucus, and to induce the patients to profit by what remains of their lungs to promote hematosis.

(3) To stimulate the functions of the skin by dry rubbings or by bathing in cold water. A secondary benefit of this remedy is that the patients are hardened against changes of temperature.

(4) A good mixed nourishment, not exclusively animal. During summer, milk cure; during winter, large doses of cod liver oil, if the patients can bear it, if not they are replaced with food of a fatty nature. Treatment of the affections of the stomach.

We have had for some twenty years in Germany several establishments where these cures are carried out under the constant supervision of a doctor; for example, that of the inventor of this method, M. Brehamer of Gœrbersdorf in Silesia; that of Falkenstein, near Frankfort, &c. Lastly, the establishments at Davos, in which, however, the climate is not so favourable for patients with laryngeal phthisis. The results of the cures at these establishments are very favourable in respect to the cure of the lungs.

The treatment of the larynx demands above all on the part of the patient complete silence. I admit that it is not always

very easy to obtain this, the morbid loquacity of the phthisical being only too well known.

As for the nourishment, it is specially necessary to avoid every thing irritating. In serious cases a semi-solid nourishment is preferable to a fluid.

The medicinal treatment of laryngeal phthisis consists at first in the employment of the antiseptic method. This is also adopted by a great number of specialists in all countries.

It is absolutely necessary that we entirely abandon cauterizing the parts at a venture and without inspection, and the employment of energetic topical remedies. I only allow them in cases of large ulcerations of the epiglottis in the last stage, so as to produce a protective layer, which sometimes relieves the patient for some hours. In cases of too abundant granulations, which impede the cicatrization of the ulcerations, I employ weak solutions of caustics, and only for the end mentioned and for a restricted time. We employ the antiseptic method for the larynx in different ways, principally by inhalations of carbolic acid in instillations of glycerine and carbolic acid.

I have found a very cheap and easily administered remedy in the balsam of Peru—that is to say, in the benzoic acid which it contains. I order it to be inhaled three to four times a day for five minutes in the following manner. We take half a litre (about 18 oz.) of boiling water (the heat of which is kept up by being placed over a spirit lamp), and into which is put ten drops of the following mixture,—balsam of Peru, 10·0; spirits of wine, 5.0. The patient inhales through a sort of conical funnel, made of a sheet of cardboard paper, one metre in length (nearly 40 inches). The width of the funnel at its upper end ought to fit the mouth; at the lower it ought to be the size of the vessel containing the water. Naturally the inhalations must be continued for some time, from one month to a year. It is good to change the remedies for some days every two months. The effect of these inhalations varies according to the cases.

Sometimes with or before the cure of the ulcerations the tuberculous infiltration disappears. In the most of cases it is necessary to employ other means to combat the infiltrations. The surest remedy, according to my experience based on a large number of cases, is to make free scarifications, of course, in the upper part, across the whole posterior wall of the larynx. At first I performed these scarifications for another object, and it was only by degrees that I became convinced of their great utility in curing infiltrations. Now I make them as soon as I see that the infiltrations do not diminish in three or four weeks with the inhalations. Most medical men fear to make such a

wound upon a phthisical larynx. It was with the same feeling that I made them the first time, but I am convinced that they are not at all injurious, but, on the contrary, they contribute very much to the healing of these affections.

For a long time scarifications have been recommended for acute œdemas of the larynx, and they have always been advised to be made freely. It is the same thing with chronic œdemas. It is all the more necessary for them to be freely made, as chronic œdemas are not resolved so quickly, and the wounds ought to remain open for some days. Generally—I ought to say unfortunately—they are healed up at the end of three or four days. The small pricks from a knife are already agglutinated after some hours. I advise the incision to be made with the form of scissors which I show here; they are closed after the manner of a tonsillotome, by drawing the two parts the one against the other. The scissors are introduced behind the epiglottis closed, they are then opened, the one branch is pushed down into the larynx, the other into the œsophagus. The larynx is raised in the throes of retching, and what of the posterior wall that is between the branches is cut. The pain from the operation is not much, and does not last long; there is very little bleeding in general. It is very rarely necessary to cut a second time.

I have not spoken to you of the affections of the epiglottis. I have never seen them cured, some cases of superficial ulcerations excepted. The free scarifications made with a probe-pointed curved knife relieve the patients also in these cases for a shorter or longer time. It is evident that, in the cases of deep ulcerations of the vocal chords, after their cure, there is not always a complete restoration of their function. If the chords are deformed by cicatrices the voice does not again become clear, but remains more or less husky. After some years the chords may lengthen until they resume their natural aspect, Even under these conditions we may consider them as cured just as much as in many other cases the patient is, so to speak, re-established without having recovered the complete use of all his organs.—*Edinburgh Med. Journal, Sept.* 1881, *p.* 240.

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## 28.—ON THE TREATMENT OF ASTHMA.

By J. Burney Yeo, M.D., F.R.C.P., Physician to King's College Hospital, Senior Assistant-Physician to Brompton Consumption Hospital.

[The following remarks on asthma by Dr. Yeo are appended to a description of the treatment of this complaint at Mont Dore.]

After a careful consideration of all the arguments that have been adduced against the nervous theory of asthma, the more I

see of cases of true asthma, the more impossible it seems to me to resist the conviction that there is a nervous element in every case, and in very many the nervous element is altogether the predominant one.

Let me illustrate this remark by reference to a case of so-called "renal asthma." Here we have blood contamination as an obvious cause of the nervous disturbance, and the chain of phenomena is tolerably complete. A patient, towards the closing scenes of Bright's disease, with contracted gouty kidney, and hypertrophied heart and thickened arteries, gets sudden attacks of alarming dyspnœa, arising apparently without any cause, sometimes when sitting tranquilly by his fire-side after dinner, sometimes in the middle of the night, or at any other time. He has no cough, no moist râles, but expiration is difficult and prolonged, just as in the usual form of asthma; moreover, if you let him inhale chloroform vapour, the paroxysm of dyspnœa disappears. Now it would seem that in such a case we have either a uræmic irritation of the respiratory centre setting up a sort of convulsion of the bronchial muscles, a sort of pulmonary epilepsy; or we may have a reflex excitement of the bronchial spasm in the following manner: an unusual proportion of the retained urinary excrement is being eliminated at the respiratory surface, and thus irritates the peripheral termination of the respiratory nerves, and so excites in a reflex manner contraction of the bronchial muscles. The urinous odour in the breath is always very marked in these cases.

An explanation which will hold good with regard to these renal cases of spasmodic asthma will hold good with regard to others in which the original disturbing cause is not so easily discovered. The nervous irritation may be central, or it may be peripheral. A certain inherited vulnerability or excitability (hyperæsthesia) of portions of the central or peripheral nervous system may be assumed as doubtless existing in certain persons. When it is the respiratory centre or the respiratory peripheral nerves which are thus affected, we encounter the phenomenon of spasmodic asthma, occurring from causes of excitement, sometimes so slight and impalpable as to entirely escape discovery.

But there is another possible view of the mode of action of the "nervous element" in asthma. I allude to the view put forward by Weber. He maintains that "for many forms of asthma, the existence must be admitted of a tumefaction of the bronchial mucous membrane in consequence of dilatation of its blood-vessels through vaso-motor nervous influences." Those attacks of asthma which are observed to alternate with attacks of urticaria, and in some of which patches of swollen mucous membrane have been actually observed in the pharynx, would fall under this head. In commenting on this view, Riegel

observes, "We may suppose that whenever an irritation affects the bronchial mucous membrane, this irritation may excite vascular turgescence in this region;—that the acute tumefaction of the mucous membrane of the bronchioles is the primary element in asthma may explain the milder attacks, but not the severe forms, here a second factor (muscular) must be associated; how otherwise shall we explain the frequently observed 'rapid amelioration after chloral hydrate and like remedies'?" and he concludes that asthma is a "spasm of the bronchial muscles with simultaneous congestion of the bronchial mucous membrane.'

But it must be admitted that the majority of cases of asthma —that is to say of true spasmodic, paroxysmal, respiratory dyspnœa, with distension of the chest, and prolonged, difficult, wheezing expiration—are associated with, and often complications of, a pre-existing bronchial catarrh. But in these cases there is always a nervous element upon which the spasmodic paroxysmal nature of the attack depends. In the first place, the subjects of purely spasmodic asthma may and do often become simultaneously the subjects of bronchial catarrh. There is no possible reason why they should not. But there yet remains a considerable number of cases in which the bronchial catarrh certainly appears to be the exciting cause of the asthma. Now such patients may be considered to suffer from hyperæsthesia of the bronchial membrane, just as others suffer from cutaneous hyperæsthesia, and in them the presence of tenacious, thick mucus in the finer air-passages acts as an irritant, and produces that amount of muscular spasm which is sufficient to give rise to a paroxysm of asthma. Thus it can be shown that in every case of asthma there is a nervous element; but in some cases the nervous state is the only one that needs to be dealt with therapeutically; while in others, where the bronchial irritation depends on the presence of a catarrhal state, the removal of this catarrhal condition must be the basis of any successful medication. The many practical illustrations that must occur to every one who has seen much of asthma—of its neurotic character—seem to me overwhelming.

I will allude to a few only; and first to the frequently observed alternation of attacks of asthma with other neurotic disorders, as migraine, angina, hysteria, and certain cutaneous disorders. I have at the present time under my observation a lady who suffers from asthma. Under appropiate treatment her asthma disappeared, and then she became subject to attacks of sharp pain under the left breast, with flushing of the face and sudden fainting; these attacks, in turn, have disappeared, and now her asthma, in a mild and modified form, is reappearing.

Dr. Cazalis, in his interesting brochure, "Étude sur les Sueurs

au Mont Dore," mentions the case of a lady, sixty years of age, where there was alternation between attacks of asthma and urticaria and erysipelas. All the time the skin affection was present the chest was perfectly free. The asthmatic attacks were accompanied with bronchial catarrh and a harsh, barking cough, almost incessant. During the treatment at Mont Dore, this patient became the subject of violent perspirations (*violentes explosions de sueurs*) amounting to a sort of *crise*, which in twenty-four hours "put an end to an asthma, with incessant cough, which had lasted many years," and this patient had no return either of the skin disease or of the asthma. In the second place, it must have occurred to many how very rare it is to see a purely asthmatic paroxysm in the wards of an hospital; yet cardiac diseases and advanced emphysema and bronchial catarrhs are excessively common. If asthma were simply a catarrhal disorder, as some have maintained, its manifestation would be frequent instead of rare in our hospitals.

It is scarcely necessary that I should refer to the well-known influence of sedative and antispasmodic remedies in the relief of the asthmatic paroxysm. Numerous other considerations occur to me in support of the neurotic view of the nature of asthma; but they seem to be scarcely needed in order to establish a view already so strong. I should like, however, to point out one analogy with a well-known nervous and hysterical phenomenon which has, I think, never yet been remarked upon. I allude to the great distension of the lung which is observed in many cases of asthma, a distension which has often been thought difficult of explanation; but may we not trace an analogy between this great distension of the lung in asthma with the very remarkable and hitherto unexplained tympanitic distension of the intestines often encountered in some cases of hysteria?—a condition that will sometimes arise as suddenly as the asthmatic paroxysm, and which seems to be entirely neurotic in its origin.—*Practitioner, July* 1881, *p.* 8.

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## 29.—ON THE TREATMENT OF ASTHMA.

### By Dr. Max Schaeffer.

Dr. Max Schaeffer considers that asthma consists essentially in disturbance of expiration caused by a tonic contraction of the middle-sized and small bronchi, combined with a swelling of the bronchial mucous membrane due to dilatation of their vessels consequent upon vaso-motor nervous alterations. These alterations may consist, firstly, in disease of the nerves themselves; secondly, of the nerve sheaths; and, thirdly, of the tissue surrounding the nerves. The first and second of these possibilities are rare, and may almost be left out of account. The

third is the most important, and the abnormalities in the tissues may consist either in disease of large parts of the tissues that surround the nerve and press upon it, or of single structures, such as adenoid vegetations or polypi in the nasal cavity, large tonsils, or swollen cervical and bronchial glands, any of which, when either hypertrophied or inflamed, may exert considerable pressure on the nerves. Several of Dr. Schaeffer's patients suffered from chronic nasal catarrh, frequent attacks of tonsillitis, and catarrh of the larynx and trachea, and from the author's observations it appeared that, according as the seat of the inflamed part was higher or lower, so the seat of the apparent hindrance of breathing seemed higher or lower to the patient. The author considers that all the symptoms in asthma are evidences of irritation of those nerves which are connected with the pulmonary fibres of the vagus by pressure, and this pressure is produced through inflammation, especially in the upper parts of the respiratory tract, the nose, the pharynx, the larynx, and the trachea. The anatomical relations between the pulmonary branches of the vagus and the various nerves in the respiratory tract are very close, and the vagus takes part in all the sensory, motor, and secretory functions of the superior part of the respiratory tract.

As the author, then, considers that asthma consists in bronchial congestion combined with muscular spasm, both of which are due to nervous disturbances in the vagus, and that these disturbances may be induced reflexly by irritation of the various nerves distributed to the upper part of the respiratory tract, one can easily understand that he should consider the local treatment of diseases of the nose, larynx, and trachea as the most efficient means of removing the causes of asthma. In the treatment of chronic catarrh of the nose and pharynx the galvano-cautery has proved very serviceable, and along with this are to be employed insufflation of finely-powdered nitrate of silver mixed with mica, or of tannin. Alum has proved of little use, and in many patients destroys the appetite. Inhalation of weak solution of common salt, of permanganate of potash, or of soda, increases the secretion of the mucus. Many patients think that from the use of solutions of carbolic acid they lose the sense of smell for some time. Growths must be removed if any are present. In treating catarrh of the pharynx, larynx, and trachea, warm vapours are not only useless but injurious. The best remedy for cutting short an asthmatic attack is the local application of the induced current, which often causes the attack to disappear as if by magic, and is much more efficient than the pneumatic apparatus. According as the seat of the disease appears to be in the higher or lower parts of the nerve, the author applies the electrodes to both

sides of the neck, under the lower jaw, about three-quarters of an inch in front of its angle, or opposite the thyroid cartilage in front of the sterno-mastoid. The currents must not be too feeble. The patient must clearly perceive that the current goes straight through the soft palate or through the larynx. When the attacks are violent the current should be applied for a quarter or half an hour at least twice daily. As recovery takes place the applications may be shortened until they are at length made only once or twice a week. The author rarely applied direct faradisation, and found no good from the constant current. He treated the bronchial catarrh which accompanied the asthma by expectorants, especially by Dover's powder; and he lays considerable weight on a regulated diet, avoidance of irritating drinks, and of smoking, as well as upon free exercise in the open air. When struma or erysipelas was present, the general treatment appropriate for them was employed. In one of his cases the patient suffered from nasal polypi. On their removal by means of a wire loop and by the galvano-cautery, the asthmatic attacks were greatly diminished, and by subsequent application of the induced current to the neck they were entirely cured.—*Practitioner*, *June* 1881, *p.* 458.

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30.—ON THE TREATMENT OF ASTHMA BY ELECTRICITY.

Dr. Richard Schmitz reports the case of a patient aged forty, who had been the subject of numerous and repeated attacks of asthma for eight years. At the time the electrical treatment was commenced the patient was suffering from a most severe attack which had resisted all the ordinary methods, and had compelled him to sit for three days and nights without rest. Each attack was preceded by a catarrh, which successively invaded the larynx, trachea, and bronchi, and it was thought that the swelling of the mucous membrane of the respiratory tract might have involved the vagus in its course, and it was therefore considered necessary to direct the induced currents to this nerve. The first *sĕance* was at eight in the evening; the electrodes were applied over the alæ of the thyroid cartilage, and internally to the sterno-mastoid. The current, at first weak, was gradually strengthened. The sitting lasted nine minutes, and the patient was so much relieved by it that he was able to sleep during the greater part of the night. On the next and succeeding days two more sittings a day were given, each of five minutes' duration; the good effects continued, and, after twelve applications, the patient was freed from the attacks of oppression and from the râles which embarrassed his breathing. Since the return of the patient to Hamburg he has had a fresh attack of asthma, which was cured without recourse to

electricity; but in spite of this, it appears that induced currents are useful, if not in alleviating the affection itself, at any rate in its most painful manifestations, and its effects should always be tried in obstinate cases.—*Practitioner*, *June* 1881, *p.* 460.

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## 31.—ON THE SYMPTOMS AND CURE OF CROUP.

By the late WILLIAM MACKENZIE, Andersonian Professor of Anatomy and Surgery, and Surgeon to the Glasgow Eye Infirmary.

The extreme aptness in mucous membranes, when inflamed, to secrete pus, and in serous membranes to secrete fibrin or coagulable lymph, is generally regarded among the most striking characters of these two structures. It is comparatively so rare an occurrence for a serous membrane to secrete puriform fluid, or for a mucous membrane to become coated by a fibrinous exudation, that we are liable to overlook the fact, till we recall to mind the appearances displayed on dissection, in cases of croup on the one hand, and of puerperal peritonitis on the other. Most cases of peritonitis, and also of pleuritis, and indeed of the inflammations of serous membranes generally, are attended, if allowed to run their course, by an exudation of fibrin; but occasionally in pleuritis, and commonly in severe cases of puerperal peritonitis, pus, more or less diluted, flows from the inflamed surfaces. Slight inflammation, such as what occurs in a common cold, pours from the membrane of the windpipe, throat, and nostrils, a copious secretion of puriform mucus; but in that peculiar disease called croup, the same membrane secretes a crust of fibrin; and as far as I know, this is the only instance in the human subject of a mucous membrane being affected with what may be called a fibrinous inflammation. In experiments upon the inferior animals, something similar is said to take place in other parts of the mucous system; the conjunctiva, for example, appears to secrete fibrin, when inflamed by exposure to the vapour of muriatic acid, and the rectum, when inflamed by irritating injections.

The general symptoms of croup, the extreme danger of the disease, the frequent inefficacy even of the most active and best directed treatment, and the striking appearances on dissection, are familiar to every medical practitioner. There is one fact, however, in the history of this disease, which has not as yet been noticed by authors on the subject; and one means of treatment, which has been repeatedly successful in my own hands, as well as in the hands of those from whom I first received my information of its utility, which I have reason to believe has not come into general use.

The fact to which I refer is, that the exudation of fibrin very frequently commences on the surface of the tonsils, thence spreads along the arches of the palate, coats the posterior surface of the *velum palati*, sometimes surrounds and encloses the uvula; and at last descending, covers the internal surface of the pharynx and œsophagus, the larynx and trachea. That this is the frequent progress of the fibrinous exudation, I am convinced, from the careful and repeated observations of the phenomena during life, and upon dissection.

What is of much more importance, however, than the observation of a pathological fact, is the ascertained efficacy of a means of cure for this disease. Not merely have I repeatedly found the application of a solution of nitrate of silver completely successful in removing the fibrinous crust covering the tonsils, velum, and uvula, but I have been led to attribute the rapid alleviation and ultimate removal of all the other symptoms to this remedy, even in cases in which, from the severity and peculiar signs of the complaint, I had no doubt that fibrin had already exuded from the lining membrane of the larynx and trachea.

The solution which I employ is a scruple of nitrate of silver in an ounce of distilled water. By means of a large camel hair pencil, this solution is to be freely applied, once or twice a day, according to the severity of the symptoms, to the whole lining membrane of the fauces. The surface of the tonsils, or wherever else the fibrinous crust is actually in view, will of course be particularly attended to; but I do not hesitate to push the pencil to the lower part of the pharynx. This remedy, so far from being productive of any irritation, beyond the mere mechanical and temporary one attending its employment, uniformly alleviates the symptoms of croup, such as the difficult respiration, the barking cough, and the peculiar anxiety of the little patient. It has evidently such an effect upon the diseased surfaces, both those which it actually touches, and those which are continuous, as to induce them to throw off the false membrane by which they are covered, and it appears also to prevent the farther progress of the exudation.—(*Reprinted from the Edinburgh Medical and Surgical Journal, April* 1825.)—*Glasgow Medical Journal, July* 1881, *p.* 19.

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## 32.—ON THE TREATMENT OF WHOOPING-COUGH.

By Robert Lee, M.A., M.D., F.R.C.P., Senior Assistant-Physician to the Hospital for Sick Children, Great Ormond Street.

The disease in very young children is dangerous. It is not quite correct to say that it begins in the form of a

catarrh. The disturbance of the system is more serious, and, if the question is asked of the parent whether the child has been exposed to cold, it is generally answered in the negative. The symptoms are those which more or less characterise the contagious maladies in their early though rather indefinite stage. The most marked certainly are refusal of food, prostration, restlessness, and loss of flesh, with more or less increase of temperature and quickness of respiration. We are inclined at one time to suspect pneumonia or capillary bronchitis, at another that the cause of the symptoms is dentition, or, if they are not severe, that they are due to some error in feeding. Sir Thomas Watson has followed Cullen when he says that "it begins with the symptoms of an ordinary catarrh arising from cold"; and, to show to what extent he considered the cough diagnostic of the malady, he says, "I should be slow to consider any case a genuine case of pertussis unless the characteristic paroxysms of whooping-cough and the stridulous respiration were present."

There is a symptom which is a serious and frequent one in infants, and that is the occurrence of active diarrhœa. It is true that the diarrhœa is often preceded by vomiting, but, as a rule, when the diarrhœa begins the other symptoms abate, and one of two events occurs: either the infant succumbs, in spite of all treatment, or the disease appears to exhaust itself and the symptoms do not return. The active treatment with purgatives, recommended by Sydenham, appears thus to be indicated to some extent by the natural course which the disease takes in such cases.

Sir Henry Holland pointed out the probable relation between whooping-cough and what used to be called infantile remittent fever, and distinctly expressed the opinion that they would be found to depend on the same active cause.

Before passing on to the subject of treatment there are one or two points which are deserving of notice. One, the most important, that in a family of two or three children, when circumstances compel them to be kept in the same room, and the conditions of ventilation are deficient, the duration and severity of the symptoms appear to increase and the nurse or parent is liable to suffer, from which it would seem that the atmosphere of a close apartment may become more or less highly charged or saturated with the fomites of contagion. Another point is the usual increase of fever, difficulty of breathing, and cough during the night, and it is reasonable to inquire whether this may be due to somewhat similar causes to those which mark the stages of an attack of ague or to some difference in the conditions of the nervous system during the usual hours of sleep.

One point seems worthy of mention, and that is the probable explanation of the fact that sometimes all the symptoms of whooping-cough will suddenly subside, and, after an interval of several months, reappear without any very definite reason, such as exposure to a second infection.

The subject of the treatment of this malady appears to me to be pre-eminently deserving of most serious attention. The infant mortality it has lately caused has grown to surprising importance, as the Registrar-General's Returns have made most evident. The remedies which have from time to time been recommended have been so numerous, that it is probable most practitioners would agree with Sydenham that, with some one exception, which in his case was active purging, they "have tried remedies of almost every other kind, and tried them in vain."

Failing any specific remedy we are naturally compelled to treat symptoms, making use of such agents as are generally recognised as proper for the different morbid conditions of the patient. The sensible practitioner would regard any one remedy with considerable doubt, and, while admitting the value of some few in relieving the frequency and violence of the cough, would combine with them either a febrifuge, a purgative, or a tonic, as the state of the case demanded. Thus in the early stages we might prescribe, as is often done, a combination of belladonna, bromide of potassium, and squills or ipecacuanha; later hydrocyanic acid or alum, or external applications, such as camphor, turpentine, or Roche's embrocation; and finally, when the cough seemed to resist all treatment, we should order with confidence a change of air. I recollect, some years ago, one evening a German merchant called upon me to inquire what remedy we used at the Children's Hospital, as some poor neighbours of his had told him of the good effects obtained by themselves and several others from the treatment. I informed him that we had no special remedies; but as he had come from some distance, and seemed much disappointed, I ventured to inquire what was the nature of the medicine prescribed. He said it was a mixture of cod-liver oil and steel. Now, there is only one mixture of this kind contained in our Pharmacopœia, so I had no difficulty in satisfying his wishes. But it certainly surprised me to hear that this combination, by no means an agreeable one, had obtained a reputation in whooping-cough cases quite unknown to us. Since then I have used it largely, and with as much benefit as some far more esteemed preparations.

There has been for some years a popular notion that a specific remedy does exist, though in a form which is difficult of application. I refer to the influence stated to be exerted by the

exhalations from the waste chambers which form part of a gas factory. From abroad we have statements which show that it is usual for children to be taken to these places at convenient times, and that "this is encouraged" by medical advice. I was informed by one of the physicians resident in Amsterdam, that special arrangements were made for children suffering from whooping-cough; and in our own city, at some gasworks in Holloway, for example, on certain days when the waste chambers are cleared, it is usual for many children to attend at the works with apparent benefit. The question which naturally suggests itself is this, What particular product of coal distillation would probably exert an influence on the contagion of whooping-cough? I am not in a position to answer this question at present, nor do I see how to begin such an inquiry without the assistance of a scientific chemist who has made a special study of the subject. This I hope to obtain shortly. Applying, however, the general principles of the antiseptic treatment, and assuming that there are very likely several agents present in the waste products of coal distillation which would be more or less potent in this respect, I have used largely the common one, carbolic acid, combined with turpentine, benzoin, or one of the fragrant oils. This plan of treatment has become very general, and I have heard some go so far as to say that carbolic acid will cure whooping-cough. This statement has come usually from those of limited experience, though sufficiently good results have been obtained to justify us in pursuing the line of reasoning which first suggested a trial of the remedy. Not long since I was assured by a distinguished member of our profession, who suffered severely from whooping-cough, that the only remedy which afforded him relief was carbolic acid inhalation, that the favourite treatment with bromide of potassium and belladonna was tried with the result that for a few hours the cough was relieved after taking the first few doses, but in a short time the effect passed off, and was followed by increased violence of the cough and painful dryness of the throat. In adults the spasmodic cough is the most serious symptom of the disease, but in infants we have to fear the rapid wasting and frequent diarrhœa perhaps more than the cough. So that I am compelled to admit that the use of carbolic acid inhalation must be limited, but within those limits it may be said to have a special effect. I have no doubt that some have tried the administration of the acid internally in diluted solutions, but in my own experience the results have not been such as to warrant any definite opinion. I have also tried sulphur in frequent and small doses, and have had fairly good results. There is no doubt that, as a general rule, the treatment recommended by Sydenham of purging actively is a wise one, for the distress in respiration and cough is certainly

diminished when the mucous discharges from the bowels are encouraged. It may also be observed that a spontaneous diarrhœa in whooping-cough is not to be controlled by opiates or astringents.

It appears to me, then, that we have two distinct symptoms to deal with, and that to a certain extent they are under control. With regard to the laryngeal spasm, there is no doubt we can give relief by the inhalation of carbolic acid; with regard to the diarrhœa, I think the best results are obtained, not by attempting to check the discharges by opiates or astringents, but by the administration of quinine and iron in full doses, and by the application of such combinations as Roche's embrocation, a simple compound of the oils of turpentine and amber to the surface of the abdomen. There is no doubt that infants at the breast are in less danger than those brought up by hand.

In conclusion, I would suggest a trial of other volatile agents for the purpose of inhalation, such as turpentine, creasote, oil of amber, benzoin, &c. The common plan of stirring some tar with a hot poker is certainly attended with benefit, and is largely used in my hospital practice. It is only necessary to observe that if we are to expect relief from this kind of treatment, it should be carried out on proper principles. It is of no practical use to order twenty or thirty drops of carbolic acid to be added to a pint of hot water, and the steam to be inhaled, for the quantity of acid which evaporates is only proportionate to the amount of water given off as steam, and under such conditions it is evident the amount would be infinitesimally small.—*Lancet*, *May* 7, 1881, *p.* 730.

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## 33.—ON THE USE OF STEAM IN THE SICK-ROOM FOR INCREASING THE ATMOSPHERIC HUMIDITY.

By William Marcet, M.D., F.R.S., Late Senior Assistant-Physician to the Hospital for Consumption, Brompton, &c.

It is now fully admitted that the atmospheric conditions most beneficial in pulmonary congestion, bronchial irritation, and many other affections, are warmth and humidity. Unfortunately, the temperature required indoors cannot be attained without a considerable accession of atmospheric dryness; and this we endeavour to counteract by steaming the air.

On January 20th of the present year, with a temperature of 32° out of doors on my dining-room window-sill in Grosvenor Street, the wet bulb reading gave 65 per cent. of moisture, while in that room, with a temperature of 53°, the atmospheric humidity registered only 55 per cent. On the 22nd, the temperature out of doors was 27.5°, and relative humidity 90 per cent.; indoors temperature 49°, relative humidity only 57 per

cent. On the 23rd, humidity out of doors 76 per cent.; indoors 60 per cent. It is, therefore, very obvious that, on cold days, the relative humidity in warm rooms falls to a very low figure; and, in cold and wet weather, the humidity indoors will be much below what it registers in the open air.

The usual way of imparting dampness to the air in a room is to keep water boiling with a spirit-lamp, or generate steam from the common bronchitis-kettle placed on the fire. Thus volumes of vapour are emitted, often giving an erroneous impression that the air is becoming dampened to a considerable extent. In a small room, holding only 1,454 cubic feet of air, with double doors shut, and no other ventilation than that going on through the chinks of an indifferently fitting window, I have obtained with the usual bronchitis-kettle an increase of relative humidity amounting in one case to from 57 to 67 per cent., or by 10 per cent. with an open-air temperature of 40° and 96 per cent. of humidity, which were favourable conditions towards the artificial addition of moisture. On another occasion, the increase was from 61 to 71 per cent—again 10 per cent.—with 41° out of doors and 88 per cent. of relative humidity: again a favourable condition towards the dampening influence of steam. In a third instance, the increase was from 59 to 64.4 per cent., or by 5.4 per cent.; open-air temperature 43°, and 85 per cent. of relative humidity; the circumstances being in this case rather less favourable towards the influence of steam as increasing the atmospheric humidity.

In the first of these experiments, the steam was emitted for one hour, during which time two pints and eight ounces of water were evaporated out of three pints from a common bronchitis-kettle placed on the fire. In the second, two pints of water poured into the kettle were converted into steam in thirty-five minutes, or at the rate of a little over three pints and eight ounces per hour. In a drawing-room holding 4,184 cubic feet of air, and having an adjoining back room about half as large, with which it communicated, on one occasion I could not obtain any marked increase of moisture; on another, the conversion of water into steam at the rate of four pints and four ounces per hour succeeded in adding only 5 per cent. of relative humidity; the outside temperature at the time was about 40°, and the relative humidity about 84 per cent. Another observation was made in a bedroom of a capacity of 3,218 feet; while the air out of doors contained 83 per cent. of relative humidity, with a temperature of 53°. The atmospheric moisture was 71 per cent. in the room before steam was emitted; the steaming with a common bronchitis-kettle was continued from 3.38 p.m. till 5.10 p.m.; and an increase of relative humidity by 1 cent. only could be obtained. In this last experiment, I ob-

served that, when the thermometers were held full in the stream of vapour, about a yard from the spout of the kettle, both stood at 70°, showing the air to be saturated; while, if the instruments were placed close to the steam, at that distance from the kettle, though not actually in the vapour, no increase of dampness was observed beyond that of the other parts of the room.

The results of these observations are not altogether encouraging as to the use of the ordinary bronchitis-kettle for steaming the room of an invalid. With the object of evaporating a larger weight of water within a given time, I have had a tin kettle made, supplied with tubes on the principle of the tubular boiler for steam-engines. This boiler may of course be any size, but for private use I have had it made seven inches in length, six inches in breath, and four inches in depth; four tubes, having each of them one inch in diameter, are passed through the boiler, and soldered to it top and bottom. Two necks are also soldered in the boiler; the steam delivery-pipe is connected with one of them, while a straight tin tube run through a perforated cork is fitted into the other. This tube, which is funnel-shaped at its upper end, is lowered into the water to about half an inch from the bottom, and answers three purposes: first of all, when steam is emitted through it, the water in the boiler is shown to be too low; then it allows water to be added at any time without the risk of burning one's fingers by removing a cork or a screw-tap; and thirdly, should the steam delivery pipe become accidentally stopped by some unforeseen cause, this tube will act as a safety-valve, letting out water and steam, and preventing any possibility of an explosion. Four short iron legs assist in holding up the kettle on the fire, and support it when not in use. The advantage of the tubes in increasing the surface exposed to the heat is very obvious; four tubes with three inches in circumference and four inches in length, would give an additional surface of forty-eight square inches, or about double that of the bottom of the kettle. I propose to call this vessel the Bronchitis Tubular Kettle; a tap can be fitted into the side of the kettle, away from the fire, and it may be observed that in every case where a large volume of steam is wanted, and boiling water required with as little delay as possible, there can be no simpler or cheaper means of attaining these objects.

The cost of this kettle will be, I understand, under ten shillings, without the tap. Mr. Probyn, chemist, 55, Grosvenor Street, and 7, Pall Mall East, is prepared to supply them. It will be important to keep the tubes clear of soot, and brushes will be sold for the purpose. I shall have no pecuniary interest in the sale of the bronchitis-tubular kettle.

In a first experiment with that boiler, I poured into it three pints of cold water, and placed the kettle on the fire of the small room holding 1,454 cubic feet of air at six minutes past noon; at 12.13, or only seven minutes later, the water was boiling and steam given out in large volumes. The temperature out of doors was 40°, and relative humidity 84 per cent.; while the atmospheric moisture in the room registered 58 per cent. Observations as to the relative humidity in the room while steaming was in progress were made every five minutes. A maximum increase of relative humidity amounting to 15 per cent. was obtained in thirty-two minutes; very soon afterwards, I observed steam coming out at the funnel, and the operation was discontinued. There were thirteen ounces of water left in the boiler, the evaporation having, therefore, taken place at the rate of very nearly four pints and eight ounces per hour.

Another experiment was made on a dull and cold day in February. The readings out of doors were 37° for temperature, and wet bulb 35.5°, corresponding to 87 per cent. of relative humidity. The object was to try the steaming of my bedroom, holding 3,218 cubic feet of air, with the tubular kettle. The relative humidity in the room before steam had commenced being emitted was 58 per cent. Observations were made every five minutes. I also used in this experiment a hair hygrometer, which, although very sensitive to moisture, could not be reckoned as giving such accurate indications as the dry and wet bulb thermometers. I shall, therefore, restrict myself to those readings. At 12.33, steam began arising from the tubular kettle, then holding three pints of water. At 1.25, the relative humidity had risen to 67.5 per cent., or by 9.5. From 1.35 to 2.15, I was away; but on returning into the room at 2.15 p.m. I found 70 per cent. of relative humidity, an increase by 12, which proved to be the maximum degree of humidity obtained. The hair-hygrometer had only shown an addition of 9 per cent. of humidity. From 2.15 to 2.50 p.m., when the experiment was concluded, the moisture varied between 70 and 67.5 per cent., though falling once to 63.5 per cent. The maximum increase of 12 in this case was obtained with an evaporation taking place at the rate of only one pint and four drachms per hour. The air on that occasion was very dry indoors, and cold and rather damp outside. As the external air had not much capacity for moisture, while that in the room was accessible to a considerable addition of humidity, the steam emitted remained in the room and increased the dampness of its atmosphere; had the open air been warmer and drier, its capacity for moisture would have increased, and a smaller accession of humidity would have been obtained from the amount of steam emitted. It is, indeed, remarkable that the air out of doors should have such an influence on that of a room with closed doors and windows.

In conclusion, it must be borne in mind that the steaming of the atmosphere indoors yields less humidity than might be anticipated, especially in a large room; the increase of moisture will depend on the temperature and humidity out of doors, on the degree of atmospheric humidity in the room, and on the amount of water vaporised within a given time. The tubular kettle, with the flame playing through its tubes, must give out on the same fire a larger amount of steam within a given time than the ordinary bronchitis-kettle; but, of course, the rate of evaporation of the water will depend in a great measure on the brightness of the fire.

As to the actual increase of moisture obtained by emitting steam in a closed room, I should think an accession by 10 or 15 per cent. of relative humidity may be expected under favourable circumstances, especially with the use of the tubular kettle; while under unfavourable conditions a slighter increase will be obtained, and even in a large room, the humidity added may be scarcely appreciable by the hygrometer.—*British Medical Journal*, *April* 30, 1881, *p.* 679.

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## 34.—ON THE USE AND ABUSE OF RESPIRATORS.

By Thomas Hayden, F.C.P., Dublin.

For many years I have witnessed with a feeling akin to humiliation, because of the ignorance of even the rudiments of physiology, and of the ordinary means of preserving health which it indicates, the exhibition in our streets, during the winter months, of those grotesque and disfiguring appliances called "respirators," the only useful purpose served by which would seem to be, to encourage nervous invalids from chronic pulmonary affections to take exercise out of doors, under the assurance, delusive though it be, of security against cold-catching conferred by them.

I have no doubt that the employment of respirators, as at present used, is not only a ludicrous but a mischievous mistake, and that the protection from cold-catching supposed to be enjoyed under the use of them belongs to the category of popular delusions.

In order to make my observations intelligible and justify the conclusions to which I have been led by reflection and some amount of experience on this subject, it will be necessary to recall a few elementary facts in regard to the nasal and buccal portions of the gastro-pulmonary mucous tract.

The nasal chambers are remarkable for their irregularity of surface and anfractuosity, and consequently for the enormous area of mucous membrane which they present within a very limited cubic space. This is well exemplified in the nasal cavi-

ties of the herbivores, the rodents, and other inferior mammals, and likewise, but in a less degree, in those of man. It would seem that in the construction of the nasal fossæ, as in that of the great respiratory tract of which they form a part, the utmost ingenuity has been employed in extending surface without increasing bulk or weight. [The skulls of a few of the inferior mammals and the ethmoid bone of the human skull were exhibited in illustration.]

In pursuance of this principle, adjacent bones—the superior maxillary, the frontal, the sphenoid, and the ethmoid—are in great part hollowed out, and the chambers so formed, the so-called sinuses of these bones, are brought into direct communication with the nasal passages, and constituted supplementary air-chambers. The upper or nasal portion of the pharynx is similarly utilised.

The entire of this extensive tract is covered with mucous membrane, remarkable for its vascularity and high nerve endowment. The upper or olfactory portion of the nasal surface proper, amounting to about one-half, is provided with an epithelium composed of non-ciliated columnar particles interspersed with fusiform or olfactory cells, whilst the lower half, which is essentially respiratory, is furnished with a ciliated columnar epithelium similar to that found throughout the respiratory tract.

Over this extensive surface, thus supplemented by the accessory sinuses, the eighteen to twenty cubic inches of air constituting the volume of an ordinary inspiration, are dispersed in thin layers and fine streamlets at each act of nasal inspiration, diffusing with the air previously occupying the nasal chambers and recesses, and heated to the temperature of the body by contact with their vascular lining.

It is not at all improbable that the greatest portion of the air which enters the chest in ordinary nasal breathing is thus drawn directly from these chambers, where it had been in process of heating from the preceding act of inspiration—that is, for a period of about three seconds.

This air must be in some degree vitiated by admixture with that of the succeeding expiration, but as the temperature of both must be nearly equal, and the expired air contains a larger percentage of carbonic acid, it is probable that diffusion as between them is comparatively feeble, and the preponderance of it on the side of the lighter and static air lodged in the nasal cavities. That the initial portion of a nasal inspiration is devoted to the process of diffusion, as above described, is shown by the existence of an interval between the commencement of the act and the passage of air through the larynx, distinctly appreciable to those suffering from laryngeal irritation.

The air transmitted through the nasal passages to the lungs is not only raised in temperature, but is also freed in some degree from mechanical impurity by a process of sifting through the cilia of the respiratory portion of the tract, and of fixation by the abundant viscid mucus secreted by these pasages. Where such impurity is in excess, as in the case of knife-grinders, coal-miners, wool-sorters, and others engaged in similar avocations, the natural protection thus afforded is not sufficient, and a nasal respirator is required. But under ordinary circumstances the natural provision for nasal filtration and arrest of foreign particles, if made use of, is amply sufficient. The crusts formed in the recesses of the nose, when not due to ulceration, are the product of sifting and deposition as above described.

By contact with the nasal mucus and admixture with the vapour arising from the moist mucous surface, the air inhaled through the nostrils is hygrometrically altered; it is charged with a percentage of aqueous vapour inversely proportioned to its previous hygrometric condition. The advantage of a provision to effect this change, as a mollifying agency, is readily perceived during the prevalence of the dry and parching east-winds by which we are visited annually.

The dry air, if introduced unchanged, would, by causing too rapid evaporation from the bronchial surfaces lower their temperature inordinately, and thus interfere with gaseous interchange within the lungs, and favour the occurrence of bronchial congestion.

A brief glance at the oral and buccal passages in the light afforded by the preceding remarks will enable us to judge how far they are adapted to the purposes of breathing.

The cavity of the mouth and the buccal and laryngeal portions of the pharynx are covered with stratified squamous epithelium, and, like all surfaces so provided, are, by comparison with columnar and ciliated surfaces, lowly endowed in regard to vascularity and sensibility. There is no subdivision of these passages into anfractuous chambers and recesses, and no multiplication of superficial area by projections and depressions of surface, as in the nasal cavities, nor are the mucous glands at all as numerous and complex as in the latter. Hence a column of air inhaled through the mouth is not searched to its centre, not filtered of foreign particles, and not in an equal degree modified in regard to temperature and moisture as air introduced by the nose. The saliva, indeed, might be supposed to supply the requisite proportion of watery vapour to air passing through the mouth. But air does not furnish an adequate reflex stimulus for the secretion of saliva, as witness the parched state

of the mouth and fauces after a night's sleep in those who habitually breathe through the mouth.

During the seven or eight hours usually assigned to sleep no other stimulus than the air of the apartment is ordinarily applied to the incident or excitory nerves of salivation. Hence the parched state of the mouth on awaking.

Respirators, as used in this country, are of two kinds, "oral" and "ori-nasal," the greater number being of the former kind. I have seen only one example of a nasal respirator, and this was a very imperfect appliance. They are all constructed on the same principle, and with the common object of filtering the air inspired, whilst the air expired is supposed to heat the filter, which is composed of wire or silk gauze, or of perforated zinc, encased in wool or cotton padding in most forms of the instrument. The air passed in through the filter is supposed to be raised in temperature by contact with it. This supposition is to a certain but only a very limited extent well founded. The heat is *borrowed*, the pores of the filter are too short, and the contact of the expired current with them too brief, to admit of caloric being retained sufficient to notably raise the temperature of the air next inspired. Furthermore, the trivial advantage thus gained by the use of the oral respirator is more than neutralised by the defects above described as inherent in the mouth and pharynx as a respiratory passage.

The use of a purely nasal respirator would be more rational, but such a form of the instrument has not been, as far as I know, devised, with the exception of the imperfect example already referred to. Nor can it be deemed necessary, except in the case of extreme invalids whose circulation and calorifacient power are at the lowest ebb; and these may use with greater advantage a muffler, which also protects the neck.

The nasal passages are the natural channels for the entrance and exit of air; and if judiciously employed they are, as air passages, adequate to the purposes of respiration under most circumstances, unaided by an artificial appliance of any kind. By the qualification above implied I would be understood to refer to the necessity, in the case of susceptible persons, of graduating the temperature by breathing through a handkerchief or muffler, or even through the gloved hand, for a few seconds on passing from warm into cold air, and, in case of continued exposure to a cold draught, of breathing through a muffler while so exposed.

Such persons should preserve in every way the freedom and integrity of the nasal mucous membrane as a respiratory organ. Hence they should not take snuff, and should avoid as far as possible a dusty and smutty atmosphere. They should also avoid chills, and maintain, through suitable clothing and other

obvious means, warmth of the general surface of the body. The growth of a full beard should be encouraged, as serving in a subordinate sense the purpose of a natural respirator.

I have already adverted to the use of respirators as dust-filters, under circumstances of habitual and protracted inhalation of air charged with fine sharp particles of solid matter, as in certain mechanical avocations.

This is the only useful and rational purpose served by respirators, but they should be constructed of the finest wire-gauze, incapable of rusting, and without padding of any kind; they should be frequently cleansed by washing or by soaking in water over-night, and accurately fitted to the nostrils exclusively. The wearers should be strictly enjoined to breathe through the nose only.

A further evil arising from the use of oral respirators is the habit which it entails of breathing through the mouth when they are not in use, as in mild weather and during sleep. The sheep, the ox, and other ruminants, cannot breathe by the mouth whilst browsing and chewing the cud. These animals breathe through the nose exclusively; and it is notorious how seldom they suffer from inflammatory affections of the lungs notwithstanding their exposure to the cold air by day and by night at all seasons.

In the preceding observations I have, as it seems to me, shown cause for arriving at the following conclusions, viz. :—

The nasal passages are the natural channels for the introduction of air into the lungs, and its expulsion therefrom; they are, by their construction and organisation, admirably adapted to serve as such, and, if judiciously employed and in a healthy condition, are adequate for this purpose under the varying conditions of weather and climate unaided by artificial appliances of any kind.

The mouth and fauces constitute the natural passage for aliment; they are not designed for use as air-passages, and should not be employed to supersede the nares in breathing.

By their communication with the larynx they are, however, obviously designed to serve as alternative air-passages, supplementary of the nares when the latter are obstructed, or from any cause incapable of conducting air to the lungs.

The use of oral respirators is based upon a misconception of the functions of the mouth in regard to respiration, and they should not be employed, because they are not only unnecessary, but positively mischievous, by the habit which they induce of breathing through the mouth.

Nasal respirators may be useful, under special circumstances, to exclude dust from the air-passages.

Muffle-respirators may be used to protect from draughts of

cold air, but the muffler alone will serve equally well for this purpose.

Finally—respirators for the occasional exhibition of certain medicines by inhalation are often useful, and may for this purpose be either oral or nasal.—*Dublin Journal of Medical Science, June* 1881, *p.* 494.

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## 35.—THE DIRECT METHOD OF ARTIFICIAL RESPIRATION FOR THE TREATMENT OF THE DROWNED, &c.

By Benjamin Howard, M.D., F.R.C.S.Ed.

"1. *Instantly* turn patient downwards, with a large firm roll of clothing under stomach and chest. Place one of his arms under his forehead, so as to keep his mouth off the ground. Press with all your weight two or three times, for four or five seconds each time, upon patient's back, so that the water is pressed out of lungs and stomach, and drains freely out of mouth. Then:

"2. *Quickly* turn patient, face upwards, with roll of clothing under back, just below shoulder blades, and make the head hang back as low as possible. Place patient's hands above his head. Kneel with patient's hips between your knees, and fix your elbows firmly against your hips. Now—grasping lower part of patient's naked chest—squeeze his two sides together, pressing *gradually* forward with all your weight, for about three seconds, until your mouth is nearly over mouth of patient; then, with a push, *suddenly* jerk yourself back. Rest about three seconds;—then, begin again, repeating these bellows-blowing movements with perfect regularity so that foul air may be pressed out, and pure air be drawn into lungs, about eight or ten times a minute, for, at least, one hour or until patient breathes naturally.

"*Note.*—The above directions must be used on the spot, the first instant the patient is taken from the water. A moment's delay—and success may be hopeless. Prevent crowding around patient; plenty of fresh air is important. Be careful not to interrupt the first short natural breaths. If they be long apart, carefully continue between them the bellows-blowing movements as before. After breathing is regular, let patient be rubbed dry:—wrapt in warm blankets—take hot spirits and water in small occasional doses, and then be left to rest and sleep."

While in England, as in America, the average layman usually at a glance seizes the principle, and on a careful reading at once becomes competent sufficiently well to practise the direct method, professional experts, on a closer examination, will find in it some important facts unknown before, assuring in the

treatment of the drowned, and of apnœa from any cause, an effectiveness otherwise impossible.

As I proceed, I think it will appear, though perhaps not in the order I may now indicate, how in contrast to the instructions of the Royal Humane Society, and also of the National Lifeboat Institution—

1. The direct method alone provides for a thorough preliminary ejectment of fluids from the stomach and thorax.

2. This method alone makes the drainage of the pharynx constant, precluding failure from lodgments there, or suction thence into the trachea.

3. In this method, the usually impracticable task of opening the mouth and pulling forward the tongue is more than superseded by simple position.

4. The same position also secures, and in the only way possible, the instant elevation of the epiglottis.

5. The compression by this method is the most complete, and capable of the most delicate adaptations.

6. It is the only method which can be practised by one person, and which by the same person can easily be continued as long as it may be of use.

Having myself corroborated, both by experiments and in practice, the conclusions of the first Resuscitation Committee of the Royal Medical and Chirurgical Society respecting the swallowing and inspiration of water, either the one or the other, or both, according to certain conditions of the submersion, the direct method, in contrast to the method curiously enough recommended by that same committee, begins by emptying the water-logged thorax, relieving the distended stomach, releasing the otherwise immovable diaphragm, and thus making an inspiration possible.

Having further corroborated the results of the experiments by the same committee respecting the "enormous force," as they state it, with which fluids, and even solid bodies, may, by the suction of an inspiration, be drawn into the trachea, in contrast to the position most favourable to these accidents, so strangely recommended by this same committee, the direct method maintains drainage of the entire pharynx from the beginning to the end of the operation.

In the position for first ejectment the roll of clothing, by its size, makes the thorax and stomach the highest points, the nostrils and mouth the lowest; the latter being kept free of the ground by a wrist or forearm of the patient beneath his forehead. The displaced fluids rushing forward and downward cleanse the upper air-passages, which by position are then completely drained.

On the release of this first compression for ejectment, the

rebound may, at the very outset, secure an inspiration—the one aim of the whole process.

The facts in this method, to which, without reserve, I referred as new and important, and which relate to the head-down position of the supine patient, may be found in detail in No. 6, vol. viii., of the Proceedings of the Royal Medical and Chirurgical Society. They are briefly as follows.

In the position of utmost extension of the head and neck, as I call it, and which simply by the elevation of the thorax, as directed in the supine position, is made moderately possible, the line of gravitation of the tongue has its terminal point shifted from the posterior wall of the pharynx to the hard palate, at or about its junction with the soft palate. The entire posterior wall of the pharynx is shifted backward; its anterior wall is shifted forward; thus, its antero-posterior diameter, as much as is possible, is throughout increased; while, by the shifting upward and backward of the nares, their entrance is brought more directly over and in a line with the course of the pharynx. The larynx being pulled downward and forward by the sterno-thyroidei muscles, and fixed there, the extensive motion upward and backward of the lower jaw puts upon the stretch the genio-hyoidei, mylo-hyoidei, and anterior bellies of the digastric muscles, causing the hyoid bone, and, by means of the hyo-epiglottic ligament, the epiglottis, to share together the motion of the jaw. Thus, the epiglottis is instantly made vertical. The thyroid insertion of the palato-pharyngei muscles being brought downward and forward by the sterno-thyroidei and fixed, the palato-pharyngei muscles are put upon the stretch their whole length by the extensive movement upward and backward of the head; and thus the posterior pillars of the fauces, the arches of the palate, and the velum palati, into which latter membrane these muscles are inserted, are all pulled downward and forward; they are thus made tense and kept so. The velum being thus stretched some distance in front of the back of the pharynx, a postoral air-way is secured, from the nares to the glottis, from which the tongue is doubly excluded.

Hitherto the propositions for obtaining an air-way without the existence of which nothing except failure can be assured, have, even in the best selected circumstances, been practicable only in part. In No. 21, vol. i., of the Lancet, I have stated the fact, and shown the reasons why it can be no otherwise, that for the elevation of the epiglottis, the universal practice of pulling forward the tongue, however skilfully it be done, avails nothing, in spite of the fact that, even with the aid of jaw-prisers and gags, and tongue-forceps and assistants, and all the appliances of the operating theatre, the opening of the

clenched jaws and the seizing of the tongue, which is deemed but a preliminary to the raising of the epiglottis, is oftentimes, as any practised chloroformist will admit, one of the most difficult tasks he is called to perform.

In the face of this experience of experts, the following instructions to the accidental bystander by the Royal Humane Society, if the matter were a less serious one, would be simply comical.

In these instructions, after directions to send for medical assistance, the solitary and unlearned comrade of the drowned man at the water's edge is told to "open the mouth, draw forward the patient's tongue and keep it forward," the only suggestion as to how, in either case, he is to do it being, "apply an elastic band over the tongue and under the chin."

It may be superfluous to say that, after much inquiry, I have been unable to find anybody who had ever even heard of a drowning case in which by a layman these instructions had been carried out—and for the best of reasons.

With the jaws inseparably clenched, the slippery tongue receded into the pharynx, the epiglottis fallen back—only as either one or more of these conditions may be accidentally incomplete, can exchange of air, or recovery by any mere thoracic procedure whatever, be possible. Just here appears conspicuously one of the merits of the direct method. The bystander has simply to place the patient in the position as directed, and instantly the free postoral air-way is substituted for an impassable oral way in the manner described, and respiration is at once possible.

When, as sometimes occurs, syncope is a principal or incidental feature in the case, this position is, of course, for that also, the best and quickest remedy. Mucus, too, and other accumulations which otherwise might flow or be sucked into the trachea, are thus during respiration, as I have before remarked, constantly drained away.

Having now an open and widened air-way, we come to the movements for respiration, in which manual compression of the thorax and displacement alternate with inevitable rebound, corresponding inrush of air, and replacement.

The precise manner in compression which I prefer is to place the thumbs along the anterior free borders of the costal cartilages, so that the fingers naturally fall into the lower intercostal spaces. The force then applied to the ribs, is, through the medium of the thoracic parietes, so distributed, as, without shock or violence, to bend the ribs upon themselves in the line of their own axes, the operator feeling his way as to how little or much he is doing, or may do, and regulating his course accordingly. More particularly, he is thus able on the first

return of short and imperfect gasps to observe, aid, and deepen these, and, in various ways impossible by the Humane Society's or other methods, to adapt his movements to the varying need of the moment.

The direct method is as easy to do as it is to understand. The kneeling position, even if not habitual with the operator, is not a tiring one. The part to be pressed is raised to his hands, and his weight is the chief force employed, while there are frequent intervals of complete rest. The rate of the respirations, which, it will be noticed, is one-third to one-half slower than in previous methods, gives, even then, nearly three times more respirations a minute than will, as can be easily proved, suffice without discomfort for an ordinary healthy man in repose. The eight-or-ten rate, while it supplies more oxygen than the asphyxiated or partially recovered patient can for some time assimilate, allows of better diffusion, minimises superfluous disturbance, and promotes ease in its continuance. On such an inconvenient spot as a boat, as also on a feather bed, etc., where the other methods are impracticable, I have myself, as have others, effectively continued this method entirely unaided for more than an hour.

In all these particulars also, this method is in complete contrast to the other methods. The illustrations of the Marshall Hall method include three or four operators; for the Sylvester method two at least are necessary.

For the semi-rotation of a perhaps heavy and virtually dead body, at the rate of seventy-five times every five minutes, according to the instructions for the Marshall Hall method, no one man would be strong enough; and no four accidental bystanders would be trained enough to do it in unison. Without discussing the otherwise possible merits or demerits of this method, it is, for the treatment of the drowned, simply as nearly as possible impracticable.

In performance, the Sylvester method is both difficult and very fatiguing. The holder of the tongue is directly in the way of the operator. The compression desired is attempted upon a part almost beyond the reach of the operator; is made transversely to the ribs and downwards, instead of in the line of their axes, and inwards and upwards; while between the hands of the operator and the part to be pressed are interposed the arms of the patient. The maximum of labour thus so ingeniously adapted to a minimum of effect, is such that a few minutes' faithful performance of it quite exhausts the strength of even a skilful and duly assisted operator. The first and fatal check which, as I said, I myself received in the use of this method in connection with the Metropolitan Police of New York, however, and arising, I think, in part from the obscurity

of relation between the motions as directed, and what non-medical persons know about the process of breathing, was owing, I afterwards found, to no local causes. Extending my personal investigations to almost every receiving house in Europe, I found that, with the exception of those on the Serpentine in London, even the *employé* experts, followed the instructions "draw the arms *gently* and steadily upwards," and "then turn down the patient's arms and press them *gently* for two seconds against the side of the chest," in such a *very gentle* way, that uniformly the whole process was simply a moving of the arms up and down *gently* in their sockets. This so completely missed the principle and the objective points of the method, that even the author of it would admit such performance to be a parody, which could promise no certain benefit.—*British Medical Journal*, *June* 18, 1881, *p.* 963.

## DISEASES OF THE URINARY ORGANS.

### 36.—ON THE ACTION AND USES OF CITRATE OF CAFFEIN AS A DIURETIC.

By David J. Brakenridge, M.D., F.R.C.P.E., Physician to the Royal Infirmary, Edinburgh.

Caffein, the active principle of tea, coffee, cocoa, and guarana, is a very potent substance, the physiological actions of which, in both toxic and therapeutic doses, have received much attention of late years.

On many points, however, the results obtained by different experimenters are very conflicting. I will therefore avoid all discussion of these disputed points at present. The only well-established fact which we have until recently been able to turn to therapeutical account is that caffein is a powerful cerebral stimulant. Hence its chief use, apart from its popular employment in the familiar beverages which contain it, has been as a remedy in nervous headache and opium poisoning.

In January 1879, Dr. Lewis Shapter, in a paper in the Practitioner, first directed special attention in this country to the citrate of caffein as a diuretic in cases of cardiac dropsy. He, however, acknowledges his indebtedness to Professor Gubler, who had previously shown that the citrate or bromhydrate of caffein, in doses of gr. iv. to gr. viij., given either hypodermically or by the mouth, induces abundant and instantaneous diuresis in such cases.

During the past eighteen months I have prescribed this drug in a large number of cases of cardiac and renal dropsy, both in the wards of the Edinburgh Royal Infirmary and in private practice, and the results which I have obtained have been for the

most part confirmatory of the favourable results obtained by these observers, and more recently by Dr. Leech.

Some time after commencing the use of the drug, however, I began to fear that it was likely to prove one of those uncertain remedies which, frequently failing us altogether at a critical moment, we learn after a time to discard as untrustworthy, and that I would have to acquiesce in the verdict of Dr. Leech, who qualifies his otherwise highly favourable opinion with these words: "Most drugs are found to act differently on different individuals, but caffein is specially variable in its effects."

A more careful study, however, of the circumstances under which these failures and variations in the action of the drug have occurred has led me to reverse this unfavourable opinion.

Citrate of caffein has, I believe, a special action, being chiefly a stimulant of the renal glandular epithelium, and very slightly, if at all, a vascular diuretic. It has therefore, a special and limited place as a diuretic. Acting upon this view of its action, I have never been disappointed in obtaining a marked increase in the flow of urine by its proper employment in suitable cases, and, when necessary, suitably combined with other drugs. But I am afraid it will be impossible to understand the special action claimed for the drug unless we recall to mind the anatomical arrangements in the kidney provided for the separation of the urine, and also the main points bearing on our present subject of what is known regarding the physiology of the process, and especially regarding the part played in it by the renal glandular epithelium.

In this I will purposely, to avoid controversy, confine myself to those physiological data which are accepted as important by most of our leading authorities, although I will draw from these data some warrantable conclusions which appear to me essential to the proper understanding of diuresis and the actions of diuretic drugs. The anatomical arrangements in the kidney for the separation and modification of the urine are threefold, provision being made for—1, Filtration; 2, Diffusion; 3, True Secretion.

(1) In each glomerulus, which consists of a cluster of small blood-vessels, the afferent vessel of which is larger than the efferent, and which is enclosed in a capsule, the dilated commencement of a tubulus uriniferus, we have a structure admirably adapted for filtration.

(2) In the tubulus uriniferus, which consists of a basement membrane having on the outside applied to it the capillary plexus into which the efferent vessel from the corresponding glomerulus has divided, and on the inside the renal epithelium, provision is made whereby diffusion may readily take place between the urine in the tubule and the blood in the surrounding vessels.

It must be remembered in this connexion that the tubules are further surrounded—according to Ludwig—by lymphatic spaces which freely communicate with one another.

(3) In the glandular epithelium which lines a considerable portion of the tubulus uriniferus,—especially the convoluted cortical portion,—and which in its anatomical characters closely resembles the glandular epithelium of purely secretory organs, we have a structure whose function may *a priori* be expected to be truly secretory.

Physiological experiments and observations have for the most part tended to confirm the views regarding the functions of the kidneys thus suggested by these anatomical arrangements.

I can only briefly summarize what is at present known on the subject.

(1) In the Malpighian body, filtration from the blood in the glomerulus of water containing the soluble constituents of the urine, in proportions definitely related to those in which they pre-exist in the blood, takes place into the capsular dilatation of the tubulus uriniferus.

Other things being equal, the amount of urine thus separated by filtration varies directly with the blood-pressure in the glomerulus. The variations in this blood-pressure—as is well known—depend upon either general or local causes, which I need not detail here.

(2) Diffusion must take place in the tubulus uriniferus; for all the conditions present are such as to favour the passage of water from the urine in the tubule into the veins surrounding it.

*a.* It is well known that alkaline solutions produce positive osmosis or endosmosis, whereas acid solutions produce negative osmosis or exosmosis. Now the urine in the tubule is acid, whereas the blood in the surrounding venous plexus is alkaline; hence we have here conditions which doubly favour the passage of water from the urine to the blood.

*b.* Water tends to pass by diffusion from the less concentrated to the more concentrated fluid. In this case the very dilute urine filtered from the glomerulus is much less concentrated than the blood in the venous plexus from which it has just been filtered. Hence, for these reasons, a considerable proportion of water passes from the urine in the tubulus back into the blood in the surrounding vessels. The excrementitious urine thus rendered more concentrated passes onwards through the various urinary channels out of the body.

(3) That these purely physical processes do not, as was maintained by Ludwig, entirely explain the secretion of urine, and that the function of the renal epithelium is truly secretory, is *a priori*, from the anatomical standpoint, highly probable. But many facts render this almost certain. For example, disease of

the renal epithelial cells seriously interferes with secretion. In birds, uric acid deposits are seen to originate within the cells, the disintegration of which seems necessary before the deposit can become free. After urate of sodium has been injected into the blood the same thing has been observed. Much experimental evidence may be adduced to show that the renal glandular epithelium is a true secreting structure.

It has been demonstrated that when arrest of the natural flow of urine has been caused by section of the spinal cord below the medulla, and consequent lowering of the general blood-pressure, a copious flow of *urine* can be induced by the injection into the blood of such substances as urea, urates, etc.

According to C. Ustimowitsch, "this secretion is *unaccompanied by any rise of blood-pressure sufficient to account for the flow on any filtration hypothesis.*" By experiments performed in a similar manner, Heidenhain, who, instead of urea, used indigo-carmine, demonstrated the passage of the pigment through the glandular cells into the channel of the tubule, where it was precipitated in a solid form. This substance, towards which the renal epithelial cells would seem to exert a special secretory selective activity, is well suited for experiment, as it excites no secretion of urine, and thus is not washed away, and can be traced in its progress through the cells.

Henschen and Paulynski have each recently published independent experiments which seem to throw some doubt upon the accuracy of Heidenhain's observations and conclusions, and to indicate that the pigment is separated by filtration, its appearance in the epithelial cells being due to reabsorption. Both observations may be, and probably are, correct; for if, as Heidenhain stated, in his experiments the flow of urine in the kidney was completely arrested by section of the spinal cord, filtration was impossible; whereas if, as is admitted, in Henschen and Paulynski's experiments filtration took place, then the indigo-carmine would certainly be filtered from the glomeruli along with the other soluble constituents of the urine. We have fortunately, however, evidence more conclusive even than that of Heidenhain.

To determine the functions of the two chief divisions of the renal secretory apparatus, Nussbaum experimented on a class of animals in which the blood-supply to the glomeruli is quite distinct from that which supplies the glandular epithelium. In the amphibia the glomeruli receive their blood-supply from the renal artery, whereas the plexus around the tubuli uriniferi is formed by branches which come from a totally different source, viz., one of the two branches into which the femoral vein divides at the top of the thigh. The small efferent vessels from the glomeruli certainly terminate in the so-called "renal portal-

plexus," but "actual observation of the kidney of the newt has shown that when the renal artery is tied the blood is shut off from the glomeruli, and not the slightest reflux takes place from the capillary network surrounding the tubules to the glomeruli." The kidney is thus converted into an ordinary secreting gland.

Nussbaum's experiments, performed upon such a kidney, have thrown much light upon the functions of that organ. For our present purpose it is sufficient to state that, having tied the renal artery, and thus completely cut off the blood-supply from the glomeruli, he found that, if urea be injected into the blood, a secretion of *urea* and *urine* takes place. He further injected indigo-carmine into the blood, and found, as Heidenhain had previously shown, that it is separated by the epithelial cells, where filtration is impossible.

Leaving out of consideration for the present the process of diffusion by which the urine, already separated, merely undergoes concentration, from the foregoing evidence we must conclude—

1st, That the glomerulus forms an excellent filtering mechanism, whereby the water and soluble constituents of the urine are, under the influence of blood-pressure, separated from the blood.

2nd, That the renal glandular epithelium is a true secreting structure, possessing the power of separating from the urine, urea, uric acid, water, and probably other constituents of normal urine.

3rd, That certain substances, *e.g.*, urea, possess the power of causing increased activity of the epithelial cells.

4th, That each of these two structures in the kidney, whereby urine is separated from the blood, possesses the conditions necessary for the separation of the constituents of normal urine.

5th, That in the one, the glomerulus, the process is purely physical, viz., by filtration. In the other, the epithelium, it implies a special glandular selective activity.

Hence we may assume that in health, when the blood-pressure and the renal glandular epithelium are both normal, the greater amount of urinary water, holding in solution the soluble constituents of urine in proportions bearing a definite relation to those in which they pre-exist in the blood of the renal artery, is separated from that fluid by filtration in the Malpighian bodies. But a purely physical process, whereby certain soluble substances are separated in purely physical proportions, can never free the blood from each of its impurities in those exact amounts which alone will satisfy the requirements necessary for the maintenance of health. Hence, for the glandular selective function of the renal epithelium is reserved

the higher and nicer work of further removing from the blood, in the exact proportions of each necessary for the maintenance of health, those substances which have escaped filtration, and whose retention would be injurious. By this beautiful arrangement the greater but rougher amount of the work is accomplished by the simpler process of filtration, while the lesser but finer and more exact part of the work is done by the higher process of true secretion.

It is evident, then, that these filtering and secreting organs bear a complementary relation to one another, and that the amount of work done by the one must vary inversely with the work done by the other. Thus, on the one hand, the more the urine that is separated by filtration, the less urea, water, &c., will reach the glandular epithelium to be separated by it; and the less the separation of urine in the Malpighian bodies, owing to a fall in the blood-pressure or otherwise, the more urea, urinary water, &c., will reach the glandular renal epithelium and stimulate its secretory activity. Whereas, on the other hand, if the glandular epithelium be either diseased or exhausted, and less urea, uric acid, &c., be thus separated by it, these, accumulating in the blood, will consequently, in proportionally larger quantities, be filtered from that fluid in the glomeruli. Within the limits of health, the amount of work done by each of these chief factors in the separation of urine must vary constantly and considerably; and when we pass beyond the limits of health the modifications in the balance may become much greater.

From the foregoing facts we may draw the following conclusions :—

1st, When the blood-pressure in the glomeruli of the kidney is abnormally lowered, or when thus or from any other cause, such as increased pressure of urine in the capsules, filtration is interfered with, the amount of urine separated in the Malpighian bodies will be proportionally diminished.

2nd, That, consequently, the solid constituents of the urine will thereby be insufficiently removed from the blood by filtration, and hence will be presented in increased amount to the renal glandular epithelium.

3rd, That urea, and probably the other constituents of the urine which it is the function of the renal epithelium to separate from the blood, being stimulants of the secretory epithelium, their presence in increased amount will augment the activity of the glandular cells, and cause increased secretion by them, not only of urea, uric acid, &c., but also of water.

4th, That thus, in many cases of advanced heart disease, for example, there must take place in time a gradual transference of work from the glomeruli to the secreting epithelial cells, the

latter coming, as the blood-pressure is lowered, to take upon them the secretion of more of the urinary water, as well as such solid constituents as urea, uric acid, &c.

5th, That this transference of work is not necessarily indicated by the amount or constitution of the urine passed.

For example, take two cases in each of which 20 oz. of urine are passed in the twenty-four hours. In the one the greater amount of the urine may be filtered from the blood in the glomeruli as the result of blood-pressure; in the other it may be secreted by the renal epithelial cells as the result of excessive stimulation from retention in the blood which reaches them of such substances as urea, urates, &c. This fluctuating balance of work between filtration and secretion explains many of the anomalies in the action of diuretic remedies, and for the proper selection and employment of these it seems to us important that we should not only bear it in mind, but determine as far as possible in each case its actual state.

In the foregoing remarks I have assumed that the amount of blood passing through the kidneys has been in all cases the same. It must not, however, be forgotten that the amount of urine secreted by the kidney will, other things being equal, vary directly with the amount of blood which passes through that organ.

Neither blood-pressure in the glomeruli nor secretory activity in the glandular epithelial cells can separate from the blood more urine than it contains. Hence the amount of urine must always be further conditioned by the amount of blood which circulates through the organ.

It is thus clear that drugs may increase the amount of the urine in some one or more of the following ways:—

1st, By increasing the blood-pressure in the glomeruli.

2nd, By increasing the rapidity of the circulation in, and the amount of blood passing through the kidneys.

3rd, By stimulating the renal glandular epithelium.

4th, By modifying the process of diffusion in the kidneys or in the body elsewhere.

There is no reason to believe that in the large increase of urine caused by citrate of caffein modification of osmosis plays any part, and therefore I will not further discuss it at present, although I have little doubt that some of the saline diuretics, *e.g.*, acetate of potash, act partly at least in this manner. The purely vascular diuretics act both by increasing the blood-pressure in the glomeruli and by increasing the amount of blood passed through the kidney.

Digitalis may be regarded as the type of the class of vascular diuretics. Digitalis increases diuresis by increasing arterial tension and the amount of blood flowing through the kidneys.

It "has," says Binz, "no directly stimulating effect on the secretory function of the kidneys," although it may, by thus improving the nutrition of the glandular epithelium, indirectly increase its secretory power and activity. But there is abundant evidence to show that such a purely vascular diuretic as digitalis may, in certain cases, be quite powerless, when given alone, to produce any very marked diuresis.

The fact is quite familiar to every practitioner that digitalis in combination with other drugs will often prove successful where, given alone, it had signally failed. The probability is that many of those drugs which thus increase the action of digitalis act upon the secretory structures of the kidney in some manner quite different from digitalis, either by stimulating the glandular epithelium or by modifying the osmotic processes in the kidney or in the body.

Could we say with certainty of a given diuretic that it is a stimulant of the renal glandular epithelium, we might also predict with certainty of it that it would, on the one hand, increase the diuretic effect of digitalis, and that, on the other hand, its diuretic effect would be increased by digitalis. We should further be enabled to judge when one or other or both drugs might be administered safely and with advantage.

Now, various facts brought out in my clinical experience of citrate of caffein as a diuretic have led me to believe that the diuretic action of this drug is due, *for the most part*, to a power which it possesses of stimulating the renal glandular epithelium. —*Edinburgh Medical Journal*, *July* 1881, *p.* 4.

# SURGERY.

## FRACTURES, DISLOCATIONS, AND DISEASES OF THE BONES, JOINTS, ETC.

### 37.—ON THE RELATION OF MICRO-ORGANISMS TO INFLAMMATION.

By Joseph Lister, F.R.S., Professor of Clinical Surgery in King's College, London.

If we treat our wounds by means expressly calculated to exclude altogether the entrance into them from first to last of minute organisms, not only are the specific diseases got rid of, not only do hospital gangrene and pyæmia, those scourges of former surgery, fly away as at the touch of the enchanter's wand to trouble us no more for ever, while septicæmia also vanishes, and erysipelas, though more stubborn, is robbed of its terrors,—not only, I say, do these diseases, recognised as specific, disappear, but if the treatment is properly conducted we get rid of inflammation altogether. And we see wounds that are left with their edges widely gaping, and become occupied by a substantial blood-clot, heal, it may be, without a particle of pus, a cicatrix forming beneath the superficial layers of the coagulum. Such results, proceeding from a mode of treatment designed especially to exclude bacteria, may suggest the idea that all inflammation is caused by micro-organisms, and that suppuration, whether acute or chronic, is always due to similar agencies. This I believe to be a very exaggerated view of the matter, and a view which may tend to have a serious influence upon our practice. For example, if we believe that inflammations are due only to an invasion of microscopic parasites,—if that is the sole cause of inflammation in every case, to what purpose is it to employ counter-irritation? Counter-irritation would seem an absurdity under such circumstances; and accordingly I lately read in a work by a most able surgeon the statement that counter-irritation may be regarded as a thing of the past, as something exploded. Again, in the case of those important diseases which we term strumous, the languid degeneration of tissue which we see in feeble constitutions, there is at the present time a tendency to look upon this as altogether of an infective nature. This also I believe to be an exaggerated view, and one which may injuriously affect our practice. If, for example, I really believe that the degenerated tissue is infected with an

invading parasite which is the essence of the disorder, the natural inference will be that if I am to resect a joint affected with strumous disease I ought to cut out the whole of the diseased structures; I should not be satisfied without cutting away all the degenerated textures, a practice which I believe would often be exceedingly disadvantageous to our patients.

It appears that it is a law of physiology that when two parts are nervously in sympathy with each other, if we excite a great action in the nerves of one we may distract action from the nerves of the other. Now this will serve to throw great light upon the nature of inflammation itself if we find that counter-irritation is really a valuable means for the treatment of inflammation. That such it is I will only give one or two illustrations. I once fell upon the ice with my knee bent, striking the knee and producing at once a severe strain and a severe contusion. The knee became violently inflamed, the inflammation being characterised by intense pain and effusion into the knee-joint. I treated myself by a splint to ensure rest, and hot fomentations. Every time a fresh hot fomentation was applied, though the heat was so great as to be painful to the skin of the knee, I rejoiced in it on account of the removal of the pain from the interior which always attended it. I remember once having a severe attack of sore-throat, and a mustard poultice was put on of pure mustard and water. The mustard, of course, caused a burning sense of uneasiness in the skin of the throat; but it was a delightful sensation to me, because I felt that while this burning uneasiness was caused to the skin, the sharp cutting pain of the interior of the throat was at once attacked, and gradually disappeared under the influence of the counter-irritant. Experiences like these in one's own person have a more convincing effect than reports from the lips of patients. Let me give one more example, and that is the effect of the actual cautery in certain forms of articular disease. When I went first to Edinburgh the thing that struck me most was the effect of the cautery as applied by Mr. Syme in certain cases of joint disease. The first instance of this which I saw was a young woman with an exceedingly painful affection of the shoulder-joint. It was not hysteria, for there was atrophy of the deltoid muscle from instinctive disuse, and the disease was marked by intense pain, extending to the finger-tips, instead of being limited to the joint, as it would be in hysteria. The pain was, at the same time, worse at night, depriving her almost entirely of sleep, and it was accompanied by other abnormal sensations. Mr. Syme applied the actual cautery of red-hot iron before and behind the joint, and when the patient woke up from the chloroform sleep the pain was gone, and never returned; and the disease, which had been going on and gradually progressing

for months, was cut short from that time, and before long she left the hospital with a well-developed deltoid muscle. Several cases of a similar nature happened to occur about that time. One was that of a young man with "ulceration of the cartilage" in the articulations between the occiput and the atlas, and between the atlas and the axis. The disease caused exquisite agony, shooting down to the shoulders and up into the head. The patient could not raise his head from the pillow without supporting it with his hand; he could not look up to the ceiling or turn his head at all to one side without moving his whole body. Here, again, the pain was worse at night, and that the disease had already produced great effects was evident from the fact that on examining the throat with the finger we felt an irregular prominence of the bodies of the vertebræ in the posterior wall of the pharynx. Mr. Syme applied the cautery to the skin of the back of the neck over the upper cervical vertebræ, and though in this instance the abolition of pain was not immediate, but took place more gradually, this most formidable inflammatory disorder, which had long resisted other forms of treatment, went on steadily to complete cure; and that the cure was permanent was proved by his coming to the hospital some time after to introduce his bride to us.

Now, if it be true that counter-irritation is a powerful means of treating inflammation, and if the explanation which I have given of the mode of the action of counter-irritation, as illustrated by the physiological cases, is correct, then I say the effect of counter-irritation in the treatment of inflammation throws great light upon the nature of inflammation itself, and upon the relation of the nervous system to it. If counter-irritation cures an inflammation by withdrawing nervous action from the affected part, it follows that the inflammation so cured was maintained by an abnormal action of the nerves of the part.

This conclusion is confirmed by the fact that it is in harmony with and elucidates the mode of operation of the most frequent cause of inflammatory attacks—exposure to cold. How does a chill of the surface lead to an internal organ becoming inflamed? Why should a draught of cold air upon the chest lead to an attack of inflammation of the lungs? First, it seems clear that in some way or other the effect is brought about through the nervous system; for the integument only is chilled, and the deeply-seated internal organ suffers, while the same law of sympathy or nervous connection which we have seen in counter-irritation applies equally here; it is the cooling of the skin nearest the internal organ that is most likely to cause its inflammation. And, further, the cold sometimes "strikes in" with a suddenness that conveys the idea of

a nervous shock, and seems to preclude the hypothesis of any other agency than that of the nervous system. Next we have to ask what immediate effect does cold produce upon the nerves of the surface on which it acts? One effect which cold certainly does produce is to lower the activity of the nerves on which it operates. In this respect it is the converse of heat. It therefore seems natural to suppose that cold acts in causing inflammation exactly on the converse principle that heat may act in curing it; a diminution of the action of the nerves of a part of the surface leading to an increased action of the nerves of an internal organ in sympathy with that part. And this view of the matter is confirmed by familiar experience. Suppose a man is liable to inflammatory disorder of the bowels, what is the time when he must be most careful to keep his coat most buttoned up when he walks out into the cold air? It is immediately after taking a hearty dinner; it is just at the time when there is the greatest amount of physiological activity of the organs liable to inflammation. When the nerves of the internal organ are already doing their utmost consistently with health, then it is that it is most likely to suffer from additional nervous action thrown upon it in consequence of depression of nervous activity in the chilled integument with which it sympathises—exactly the contrary effect, as it appears to me, to that of the actual cautery, the mustard poultice, or the hot fomentation.

Let me now give a single example of the influence of the nervous system in producing or maintaining chronic inflammation. Suppose a patient comes to us with chronic inflammation of the synovial bursa situated over the patella and its ligament, chronic housemaid's knee. This, as we all know, is a very obstinate complaint, and may have resisted perfect rest, blistering, and a variety of other treatment. If it has existed any length of time we find that there is not only effusion of fluid into the synovial sac, but inflammatory thickening of the surrounding tissues. Now, I find that if we make a puncture in the sac through the skin with a tenotome and introduce a little drainage-tube not bigger in calibre than a crowquill, at the same time doing this in such a way as to prevent the entrance of putrefaction and employing an efficient antiseptic dressing, we may reckon on it as a matter of certainty that the disease which has been previously so obstinate rapidly becomes cured. We change the dressing in the course of a day or two in order to shorten the tube, and at the next dressing we probably find the serous oozing has been so slight as so permit us to dispense with the tube altogether, and within a week or ten days the little puncture is healed. Meanwhile, not only is there no re-accumulation of fluid, but the thickening of the surrounding tissues disappears rapidly, and before long vanishes altogether.

Let us look at the interpretation of this fact. And first let me remark that the treatment which so rapidly causes subsidence of the obstinate disorder does not act directly upon the diseased synovial membrane at all. For we do not inject the antiseptic into the sac: all that we do is to let out the fluid and provide against reaccumulation during the next few days while preventing the entrance of septic material. It is, therefore, plain that the presence of the fluid in some way or other maintained the chronic inflammation. How did it do this? Not by means of micro-organisms, for it was clear and transparent, and contained none. Not by chemical irritation, as would have been the case had it contained the acrid products of putrefaction. Had the fluid been pus it might have been contended that it might possess some slight chemically irritating property. But it was the bland and wholly unstimulating liquor sanguinis. We are therefore led safely another step, and infer that the mere mechanical presence of the fluid, or, in other words, the tension which it occasioned, was the efficient agent. Yet it is inconceivable that the inflammatory phenomena could be caused directly by pressure of the fluid upon the synovial surface. Synovial effusion is not as a matter of fact induced by mere pressure, though carried to a far greater degree than the often slack collection of fluid could occasion. Or, if there be felt any doubt on this point, there can certainly be none with regard to the impossibility of the surrounding thickening being the direct effect of the pressure. We are therefore compelled to have recourse to the nervous system; and it is not difficult to understand how it is called into play, the sac being stretched by the accumulated fluid and its nerves thus sufficiently stimulated to maintain the chronic inflammation.—*Lancet, October* 22, 1881, *p.* 695.

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## 38.—TREATMENT OF COMPOUND FRACTURES AND WOUNDS OF JOINTS BY GLYCERINE AND CARBOLIC ACID.

By F. C. G. Griffin, M.A., M.B.Oxon., M.R.C.S.Eng., Surgeon to the Weymouth Royal Hospital.

As various modes of antiseptic treatment continue to be brought forward, and the most opposite opinions are still held as to their merits, I have thought an account of a few cases that I have treated with the glycerinum acidi carbolici of the British Pharmacopœia, without antiseptic spray or any very elaborate precautions, would be of general interest. And although the number of cases is not large, still the fact that they have all got well has produced a strong impression on my mind of the value of this mode of treatment.

A pipe manufacturer of intemperate habits, who had failed in business and taken to fishing, was engaged in hauling in a

net, with others, after dark, when he got his leg caught by a loop of rope and was thrown down, and found himself unable to rise. The fishermen carried him home, but handled him rather roughly, as they thought he was not seriously hurt. When I saw him I found he had sustained a compound fracture of the tibia, at the junction of the lower and middle thirds, and had lost a large quantity of blood from a small wound caused by the upper fragment of the tibia having been driven through the skin. I bound it up temporarily, to arrest the bleeding. After about twelve hours, when the bleeding had at length quite stopped, the temporary dressing was removed, and a pad of lint soaked in collodion applied. This pad remained on for two days, when it became partly detached, and free oozing of bloody fluid commenced from the wound. I now applied a pad of four thicknesses of lint saturated with glycerinum acidi carbolici to the wound, and a few turns of bandage over it, so as to keep it in its proper position. The lint became firmly adherent to the wound, and the next day I applied a larger pad of four thicknesses of lint soaked in the same way over the original pad, so as to keep it still saturated. On the third day afterwards I cut the edges of the two outer layers off the pad next the wound, and removed and soaked them with glycerinum acidi carbolici, and then reapplied them, and then the bandage as before. I will here state that I regard it as of much importance to the success of this plan of treatment not to disturb the layers of lint immediately covering and generally attached to the wound. After this treatment had been continued about ten days, a large blister containing dark fluid formed under the pads and showed at their edges. I now cautiously tried whether the under pad was still adherent, and finding it was not, I removed it and found that the wound had healed. I left the blister exposed to the air, and it dried up in a few days. The remaining progress of the case in no way differed from that of one of simple fracture, and the man ultimately completely recovered. I was informed by this man's wife that previous to the accident he lived almost entirely on beer, and took scarcely any solid food except a little bread, and that if she provided him with a good dinner he used to sell or exchange it for more beer. While he was under my treatment I limited him to a pint of stout daily.

The next patient treated in this way was a boy of about ten years of age, with compound fracture of the tibia, the upper fragment of the bone having been driven through the skin. The glycerinum acidi carbolici was applied on four thicknesses of lint about two hours after the accident, and covered with cotton-wool, and fresh glycerine and acid was applied to the lint daily, without disturbing the layers next the wound.

After about ten days the lint was removed, and the wound found to have healed. A speedy recovery followed. The fracture apparatus used was of the same kind as in the following case.

The next patient was a tradesman who had jumped out of a cart while his horse was running away. He in consequence sustained a simple fracture of the fibula and a compound dislocation of the foot outwards, the lower extremity of the tibia being driven through the skin, the sock, and the elastic of his boot against the ground, and the internal malleolus broken off. When he had been conveyed home the bone was still protruding, and the wound could not be got at until his boot and sock had been cut away. The bone, being covered with dirt from the road, was now carefully cleansed, and with the aid of two other surgeons, who had been sent for at the same time as myself, and arrived soon after, an attempt to reduce the dislocation was made. We did not, however, succeed in effecting the reduction until a slice of bone had been sawn off the projecting end of the tibia. After the reduction the limb was placed on an iron back splint, with two wooden slide splints duly padded and suspended from a cradle, the apparatus being of the kind used at St. Bartholomew's Hospital, in the wards of Sir James Paget when he was surgeon there, and supplied by Ferguson, the surgical-instrument maker. About three hours after the accident I syringed out the ankle-joint with a solution of carbolic acid in thirty-nine parts of recently boiled water, and then, after cleaning round the wound, applied a pad of lint of six or eight thicknesses, saturated with glycerinum acidi carbolici, taking care that the upper layers were of sufficient size to project some little way beyond the wound, so as to exclude air effectually, in case of the patient becoming restless. This was then secured by a bandage. The next day all the upper layers of lint were removed, soaked as before, and then reapplied, except the three next the wound, which were left undisturbed. Then over the lint I put a large piece of carbolic acid plaster, and secured it with a bandage. This mode of dressing was repeated night and morning for several weeks, during the whole of which time not more than about a tablespoonful of discharge escaped from beneath the pad of lint. This discharge was of a pink colour, opaque, and nearly solid. The bowels were confined, and pain and starting relieved with tincture of opium, for about a fortnight. After this the patient, who ate heartily his ordinary diet of meat, &c., the whole time, used to sit up in bed and write letters, and keep the accounts relating to his business. After six weeks I gradually reduced the amount of the carbolic acid by adding more glycerine, and

when the wound was nearly healed I used spermaceti ointment. He ultimately made a good recovery, and can walk considerable distances with the aid of two sticks.

The next patient was a cabdriver, aged about fifty years. His horse fell down as he was driving, and while endeavouring to hold him up, he was pulled off his seat, and broke his leg. He was then taken to the Weymouth Royal Hospital, distant seven miles from the scene of the accident. On his arrival there, I found that he had a lacerated wound about three inches long, through which the end of the upper half of the tibia was protruding. After the fracture had been set, and the edges of the wound drawn together, except over the seat of fracture, where, in consequence of the swelling of the leg, the skin would not meet without more force being used than appeared desirable, a pad of lint of about four thicknesses was saturated with carbolic acid and glycerine, and lightly bandaged on. The fracture apparatus used consisted of an iron back-splint, with two wooden side-splints, padded and suspended from a cradle, as in the previous case. Over the pad a piece of carbolic-acid plaster was placed. The next day a fresh pad of about four thicknesses was soaked as before mentioned, and applied over the previous one, and the plaster over them both. This dressing was repeated night and morning for about a fortnight, after which it was reduced to once a day. The man was on ordinary diet throughout, and there was no constitutional disturbance. About a month after the accident the lint next the wound was for the first time removed, and the wound found to have healed, except over the end of the bone, where there was a wound about an inch long, with bare bone exposed. The special treatment was now discontinued, and poultices were used. A little later a thin layer of bone came away, and the wound then soon healed, and the man recovered with a useful leg.

The next patient was a brewer's drayman, a large made and very fat man, accustomed to the free use of the beverages he supplied. His horses started off while he was in a public house, and when he ran to their heads and endeavoured to stop them he was knocked down, and before they could be stopped the front wheel of the dray going over the inner side of his knee, turned back a large flap of skin, and made a lacerated wound that extended into the knee-joint. A surgeon was called, who dressed the wound, put in some stitches at suitable points, and gave the foregoing account on resigning charge of the case. When I saw him a large pad of four thicknesses of lint, saturated with the glycerinum acidi carbolici, was applied over the wound, and kept saturated by fresh supplies on its outer surface renewed daily. For a week or ten days all went

well, and no trouble connected with the joint occurred afterwards, but at the end of that time the lint came off, and poultices were used instead, the edges of the skin flap being found to be sloughing, and erysipelas of the leg commencing. The erysipelas followed a severe course, as it did also in several other cases that occurred about the same time, but in the end he recovered and returned to his occupation as drayman.

The next patient was a builder's workman, who fell from a scaffold eighteen feet high, thereby sustaining a severe compound fracture of the lower jaw, while another man falling upon him broke his thigh, and the bone coming through the skin wounded the internal saphenous vein, and caused such copious bleeding that the man appeared in danger of immediate death from loss of blood. Under these circumstances a large sponge was bound tightly over the wound, and the bleeding thus arrested. The fracture was then set, a long splint and bandages being used in the ordinary way. The treatment having reached this stage when I first saw the man, who was cold, perspiring profusely, with livid face, and evidently almost dying from loss of blood, I applied the glycerinum acidi carbolici freely to the bandages over the sponge, and then lightly bound over them four thicknesses of lint saturated with it. The next day I removed the lint, cut slits at short intervals in the bandages, and injected the glycerine through them with a syringe and along the upper edge of the sponge, and then reapplied the pad of lint freshly saturated as before. This treatment was continued for a fortnight without disturbing the sponge, after which the sponge was removed, and the wound found to have healed. The man's health improved throughout, and he recovered in about the same time as if it had been a simple fracture of the thigh.—*Lancet, June* 18, 1881, *p.* 985.

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## 39.—ON THE USE OF THE SOLID RUBBER BANDAGE IN THE AFTER-TREATMENT OF SOME FORMS OF DISLOCATION AND ITS ATTENDANT RIGIDITY.

By H. J. Forster, L.R.C.S.I., Market Deeping.

Perhaps in the whole category of complaints which the general practitioner has to treat there are none more productive of an annoyance to himself and anxiety to his patient than the partial anchylosis and œdema which are consequent more or less generally on all forms of dislocation. These disagreeable after-results might easily be avoided, or at all events reduced to a minimum, in suitable cases, if the medical attendant, after the proper manipulation of the joint and a few days' rest, were to apply a suitable elastic support and enjoin the patient to move

about short of fatiguing the injured part. In the subjoined cases in illustration of the above remarks, no originality of treatment is claimed save in the material used, the advantages of which over the ordinary bandage I shall endeavour to prove.

In July last I was consulted by a patient who informed me that during the previously severe winter she had slipped and broken the small bone of her leg, as well as putting her ankle out. So the bone-setter under whose care she had been during the interval had told her. On examining the injured parts there were found considerable œdema and partial anchylosis. She also stated that her leg had been fomented and poulticed for some months, and as she had not regained her usual strength under this treatment, splints were applied from knee to ankle, and strict rest enjoined. On being requested by me to get up from the sofa on which she was lying and to move about, or even stand on her foot, she evidenced such symptoms of fear and dread of pain that I considered it useless to persist further. I consequently applied a rubber bandage as tightly as could be borne over the ankle and lower part of the leg, with the injunction it was to be removed at bedtime and reapplied in the morning. This treatment was persevered in for the next four days, when on again calling I found she could walk about fairly well, and that the œdema had almost entirely disappeared. After the expiration of a month, during which time she wore the bandage daily, she said she felt about as well as ever, and could walk any reasonable distance without help.

Another case, that of a man over whose ankle an empty cart had passed, after being under the care of an irregular practitioner for nearly three months, found himself at the end of that time with a more or less stiff joint. In his case, after the fibrous adhesion had been broken up in the manner so well described by Dr. W. Hood in the pages of the Lancet, the bandage was applied and he was ordered to get about. In a short time the result was as good as could be desired.

Three cases of partial dislocation of the cartilage of the knee-joint, after being reduced, were treated in the same manner, and gave no further trouble, not even necessitating the usual preliminary few days' rest.

Four other cases of severe sprains, two of the wrist and two of the ankle, were also successfully treated in the same fashion.

The advantages which I have found to accrue from the use of the solid rubber bandage over the ordinary calico one are the continuous elastic resistance offered by it, and the consequent absorption both of fibrous, callous, and serous effusion, as well as a greater feeling of support, enabling the patient to move about with more confidence. In these points the calico bandage

must be deficient for obvious reasons. Also, in the neighbourhood of the knee-joint, there is not merely greater adaptability in the bandage *per se* over even the ordinary elastic knee-cap, but by its greater density and elastic pressure it serves to keep *in situ* what a substance more or less wanting in these two properties can hardly be expected to fulfil. The one drawback experienced in the continuous use of the rubber bandage is the production of minute vesicles, which may become troublesome; however, this inconvenience may be avoided by punching several small holes in the material at suitable intervals.—*Lancet, May* 21, 1881, *p.* 821.

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## 40.—ON CARBOLIC ACID POISONING (SURGICAL).

By S. Rutherford MacPhail, M.B. Edin., Liverpool, Late Resident Medical Officer to the Greenock Infirmary and Fever Hospital.

Carbolic acid poisoning, the subject of the following paper, is really a side issue on a main subject. Therefore it is that, in introducing it, one finds it impossible to avoid some reference to the antiseptic treatment in general, and especially the modification of it with which the name of Professor Lister is so justly associated.

At the outset I think it is necessary to state distinctly that the Listerian method of surgical treatment does not resolve itself into the mere employment of any reagent such as carbolic acid. The germ theory of putrefaction, on which antiseptic surgery is based, assumes, as proved by the researches of Pasteur and others, "that putrefaction does not occur except in the presence of organisms, notably bacteria; that it is produced by their agency; that they are always derived from similar organisms, and, when implanted in a suitable soil, will multiply indefinitely." Now we know that there are certain germicide agencies, of which carbolic acid, though the chief, is only one of a series, that absolutely put a stop to the development and reproduction of these germs, and coincident with this arrest the unhealthy action of the wound either disappears if it has already occurred, or, on the other hand, may be entirely prevented from taking place. To put this in other words, antiseptic surgery aims at completely arresting the development of putrefaction. Although the protection which antiseptics give cannot claim to prevent suppuration in any absolute sense, it avoids the most common cause of its occurrence by excluding the septic atmosphere. There is a form of suppuration which is set up by other causes, such as inflammation, or irritation of the wound in any way, and over this it is perfectly powerless. Indeed, irritation by means of the antiseptic material used is itself sufficient to

cause it when applied in too strong a solution, or too directly or constantly, to the wound surface. To any one who has worked much with carbolic acid, the antiseptic reagent we are specially dealing with in this paper, its irritating properties must be abundantly evident without special proof.

As I take it, the Listerian method of antiseptics, while aiming at perfection, still finds itself much in need of a material to which no objection can be taken. In other words, a non-poisonous, non-irritating substance, possessing at the same time the advantages of carbolic acid, in our antiseptic dressings, is still a desideratum. With our present knowledge we must use carbolic acid spray and gauze, recognising that, though as antiseptics they are all that can be desired, they are yet possessed of powers for evil as well as for good; and if we wish to make a judicious employment of them, we must strive to limit the former, while not interfering with the efficacy of the latter.

The substitution of absolute phenol for the ordinary commercial or crude carbolic acid has in a slight measure lessened the irritating effects noticeable in the earlier applications of carbolic acid in surgical dressings. The explanation of this is, that the latter contained a homologous substance called cressol, which, while possessing antiseptic properties in a small degree, was likewise a most powerful irritant.

At the outset of a case treated antiseptically there is not so much danger in using an excess of carbolic acid, for at this stage the hyperæmia so caused is rather an advantage, as it tends to promote primary union. It is in the subsequent treatment that the direct contact of the carbolic fluid must as far as possible be avoided, for it must be remembered that a very weak solution is sufficient to keep a wound once thoroughly aseptic free from suppuration. The most favourite of the practices indulged in by those whose zeal is greater than their knowledge consists in the frequent dressings and syringings of the wound, or "thoroughly keeping the limb in pickle," as I heard one of the class I refer to term it. Great surprise is shown when suppuration and probably pyæmia are induced by following out this course, and a reproach is cast on the antiseptic system. They forget altogether that the practice implies a theory, and that this over-zeal in the use of the means is the cause of the hyperæmia and suppuration, the very things the theory seeks to avoid. Especially, I think, is the daily syringing of the wound to be deprecated so long as it remains aseptic, for it completely prevents one of the greatest triumphs of the antiseptic system, viz., the asuppurative organization and cicatrization of the blood-clot. Besides, it complicates the treatment of the case by setting up what Professor Lister has termed "antiseptic suppuration," thus rendering the perfect drainage of the wound

more difficult. It means, in fact, converting the primary and preventive use of the drainage-tube in antiseptic surgery into the secondary drains for which they were originally intended by Chassaignac, who introduced them into practice for the escape of matter already formed in a wound.

But it is with another consequence of the use of carbolic acid that I am chiefly concerned. I refer to intoxication or poisoning from carbolic acid dressings. The literature on this subject, considering its importance, is very meagre, and comes chiefly from the pen of German authors, notably Dr. Küster of Berlin. Even German writers are not agreed among themselves as to the real character of the cases that have been described. In a letter I lately received from Mr. Lister on this subject, he tells me that Dr. Maas of Freiburg suspects, from the fact that a high temperature occurred in the cases, that what was set down as carbolic poisoning was in reality, in a good many of the cases, septicæmia. To use antiseptic treatment does not ensure exemption from septic blood-poisoning. But, going on the assumption that the use of antiseptic reagents gives immunity from septicæmia, one is apt to attribute dangerous symptoms to some other cause, and the favourites are carbolic poisoning and fatty embolism. At the discussion on antiseptics by the Metropolitan Counties Branch of the British Medical Association, Mr. Macnamara made some interesting observations on the subject of septic blood-poisoning. While admitting that pyæmia and septicæmia sometimes went hand in hand, he thought that they had not necessarily any relation with one another, for septicæmia depends on changes in the blood which sometimes occur independently of the atmosphere. Therefore a proportion of such dangerous symptoms occurring in the course of the antiseptic treatment may be eliminated, for he says, "Similar symptoms occur, for instance, from a person receiving a blow on the head with no external injury, but septicæmia is set up in consequence of injury to the dura mater or to the inner table of the skull." We must, then, carefully discriminate between such cases and those in which the use of carbolic acid is to blame.

In a certain small percentage of hospital antiseptic cases, without any assignable cause, there occurs a rise of temperature —as much as 3 or 4 degrees Fahrenheit—due to what Volkmann calls "aseptic fever." Here, with a temperature over 100°, there is no other manifestation of constitutional disturbance; the patient is doing well, and the progress and aseptic condition of the wound are not interfered with. This is probably a toxic effect of carbolic acid, and may be classed under the minor degrees of the affection we are considering.

Again, mere darkness of the urine as the result of carbolic

acid, though undoubtedly a warning to the surgeon to be on his guard, is in itself a matter of no moment. I have seen more than one case progress favourably to convalescence with dark, smoky urine; but no other symptom having supervened, the changing of the dressings and the substitution of some other material was not necessitated.

The use of dressings containing carbolic acid sometimes produces a form of eczema or erythema from their continued application, the effect being produced on some in a much shorter time than on others, owing to the special susceptibility or delicacy of the skin of the individual. Here, however, the condition is aggravated, if it is not caused, by the crude paraffin contained in the gauze, so it is quite possible that carbolic acid is only partly responsible for this form of irritation.

In what class of cases is it that carbolic poisoning has been reported to have occurred? Is it in the treatment of ovariotomy, where the operation is often protracted for hours, or in empyema, where the pleural lining membrane is exposed to such a chance of irritation as is the peritoneum in ovariotomy? No; I do not think there is a single case reported where symptoms of poisoning occurred, unless in a very trifling degree, in either of these two very likely classes. On the other hand, its occurrence is most common in any large recent wound, and more especially in large abscess cavities. Professor Lister, in a lecture of his published in the Lancet (December 20, 1879), explains the reason. He says, "I believe the secret of our immunity from these toxic effects is that we avoid as much as possible all unnecessary action of the carbolic acid upon the tissues." The case he was speaking of was a child of three years old, in which he treated an empyema antiseptically, and he gives it as his opinion that if he had injected carbolic fluid into this patient's pleural cavity, and especially if he had done so at each subsequent dressing, there would in all probability have been carbolic acid poisoning. The reason why the most likely cases are exempt, while others not nearly so favourably situated for the manifestation of these symptoms have them in their entirety, is to be sought for in one and the same cause, viz., the unnecessary application of carbolic acid to the system; and to the avoidance of this kind of practice the best surgeons, in this country, at all events, owe their comparative immunity from carbolic acid poisoning.

I have the personal authority of Mr. Lister for saying that in his hospital and private practice he has only had one case in which he could attribute dangerous symptoms to the use of carbolic acid. Here general debility and derangement of the digestive system, in addition to the peculiar dark-green coloration of the urine found in such cases, were the result of a course

of carbolic treatment by the usual antiseptic form of dressings after an operation. These symptoms immediately disappeared on changing the gauze dressing to one of boracic acid, but only to return again when recourse was had to the carbolic acid and spray as before.

Now I think, with this high authority on the subject before me, I may draw the inference that this toxic effect from the external application of carbolic acid in surgical dressings may occur in a certain small percentage of cases even under the best management. As certainly, however, can it be pointed out that it is the result of a rare idiosyncrasy in those affected, provided we endeavour to eliminate those sources of fallacy I have sought to indicate. Therefore is it that we must not shut our eyes to the fact that this class of case does exist; and it is as a contribution to elucidate this part of the subject that I have been induced to write this paper.

The only two substitutes for carbolic acid that have been prominently advocated as open to none of the objections we have been discussing are acetate of alumina and eucalyptus globulus. A year or two ago Professor Maas of Freiburg, on account of the poisonous effects of carbolic acid and its volatile properties, introduced a 15 per cent. solution of acetate of alumina as a cheap and efficacious agent for antiseptic dressings, and possessed of the additional advantage of inducing no toxic effects. It has not, as far as I know, been put to the test in this country, and the chief objection to it is that it is only applicable in the moist or liquid form, and is useless as one of the component parts of any antiseptic dressings, for, in the dry state, it decomposes, acetic acid being given off.

It is to Mr. Lister that we are indebted for the introduction of the other substitute, eucalyptus globulus. At a recent debate in the Clinical Society of London on the fatal case of carbolic acid poisoning related by Mr. Pearce Gould, and to which I have already alluded, Mr. Lister recognised the necessity of being possessed of a suitable material to employ in those cases where grave symptoms occurred owing to the toxic and irritative effects of carbolic acid dressings. This agent, he says, he has found by experiment to be a perfect antiseptic, and quite free from any unpleasant results, owing to its bland and unirritating properties. It cannot, however, be used as a lotion, as the oil of eucalyptus does not mix with water; but he has prepared a gauze by a process similar to that by which carbolic gauze is prepared, in the proportion of one part of the oil of eucalyptus to three each of paraffin and dammer gum. This preparation he has found to be a very efficacious one, and, in his opinion, ought to be very suitable in the class of cases where the idiosyncrasy we have been discussing occurs.

I would therefore submit that there exists no cause for alarm, though we are occasionally brought face to face with the undoubtedly evil effects of the employment of carbolic acid in our surgical dressings, for in these two materials we are possessed of a very efficient substitute when employed together, the one making up for the deficiencies of the other.

It is also, I think, a very graceful act on the part of Professor Lister, while personally he has experienced no evil results from the employment of carbolic acid, to lead the van in bringing before the profession a substitute for what has been termed his "pet reagent," thus removing another of the objections to the antiseptic system, which he has done so much to render popular in this and other countries.—*Edinburgh Medical Journal, August* 1881, *p.* 132.

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## 41.—ON THE USE OF SPONGE PRESSURE AS A SURGICAL DRESSING.

By James Hardie, Assistant-Surgeon to the Manchester Royal Infirmary.

The ordinary methods of dressing operation cases, whether antiseptic or otherwise, are by no means perfect. To many minds the mention of antiseptic dressings conjures up an infinite amount of trouble and pains and pitfalls. The trouble and pains we might leave out of account, as they soon become a second nature to us, though, for all that, we should be glad to be relieved of some part of them. But, then, every time the dressing is changed the patient is distressed, and there is also a risk of something going wrong. Certainly the handling of the part is not conducive to healing. Quite the reverse, for it may injure recent union. Possibly septic material may gain access to the wound, and the treatment so break down. But still, though everything goes on well, this repeated changing of dressing has to go on too; and, as I have said, every surgeon admits that this is itself an evil, and the less often he has to do it the better is he pleased.

Let us consider, then, what are the conditions of a wound, say an amputation stump, which require this frequent change of dressing. Dressings are changed because of the amount of discharge which has escaped into them. Whence this discharge? What does it consist of? You cannot inflict a wound, however small, on any part of the body without the speedy occurrence of two phenomena—first and immediately the effusion of blood, and second and later the effusion of material for the healing of the wound. Now, this effused blood and so-called inflammatory material constitute the discharge we have to deal with. The former generally early ceases, but as regards the latter, its

quantity and quality also depend greatly on the conditions of the part implicated. For instance, you know that in operations on the lip—as for hare lip—when the edges have been brought accurately together no great amount of discharge takes place, and union of the wounded surface is soon accomplished. Here we have a tissue which is dense and firm, and affording little room for the accommodation of extra-vascular discharge. In the case of a wound under the eye, again, you know that it is followed by a large amount of swelling of the adjoining parts, and this is due to the fact that here the tissue is loose and cellular; and we find, as a matter of fact, that under ordinary circumstances the healing of a wound in this region is accompanied by the filling up of this loose cellular tissue by extra-vascular effusion. This takes place in the case of all wounds in this region to a greater or less extent, but the extent is much less in the case of a clean incised wound than in that of one which is contused or lacerated. If the surgeon has brought the edges of the wound accurately together, and the effusion be large in amount, a further train of phenomena will then probably ensue, which are referable to the tension of the tissues, and which you are all familiar with as acute inflammation. Bearing these cases in mind, then, and reverting to that of the amputation stump, we find that we have an extensive wound through tissues of various degrees of density, some being tough and unyielding and some loosely cellular, while the surfaces of the wound are so uneven that when brought together they afford a multitude of pockets and corners which in ordinary course will be filled up by discharge of one kind or another. The wound being an extensive one, and there being considerable bruising of tissue by sawing the bone and ligaturing or twisting the vessels, it is to be expected that the discharges will be somewhat abundant in all cases; and if the surgeon, forgetful of this, neglect to make due provision for its escape, disastrous consequences will probably ensue. Hence the use of drainage-tubes of one kind or another. But a drainage tube cannot be looked upon as an innocuous body in a wound. However beneficent its purpose, it is to all intents and purposes a foreign body, and as such must create some degree of irritation, increasing by so much the amount of discharge. A drain, then, is to be regarded as an evil, except so far as it prevents a greater evil. And here I may remark, somewhat parenthetically, that the present fashion of using drains almost up to the very closing of a wound, the end being clipped off every few days as the latter fills up, although interesting enough, has always appeared to me most inartistic. Is there nothing better than this mere playing with nature?

We have now to consider the behaviour of those effused pro-

ducts—the blood and the inflammatory discharge—in regard to the healing of the wound. The blood which remains between the flaps of course first coagulates, and a large proportion of the fluid portion early escapes from the wound. The clot itself may either break down, and also entirely escape from the interior, as it probably does when it is large, or if small and spread out it may, as it is said, become "organised"—that is to say, it affords a nidus or support for the new interlacing tissue which ultimately unites together the opposed surfaces of the wound between which it lies. Day by day it loses more of its serum, and becomes more firm, and ultimately, when it has been brought completely under the influence of the tissues, it is probably entirely absorbed. It is unnecessary for us to consider whether, as some maintain, the clot itself ever contributes actively to the formation of the new connecting material. This you have doubtless had fully discussed in your pathological studies. Enough that it is unnecessary, and that it interposes itself as an obstacle to the immediate union of the cut surfaces, and thereby throws on them the necessity of elaborating a larger amount of new growth than would be otherwise required. As regards the inflammatory material—the serum and plastic exudation—you will understand that in such parts of the opposed surfaces as are somewhat firm and closely applied to each other, barely more is here thrown out than is actually required for immediate union, while into the loose cellular interspaces, and more particularly into the nooks and crannies of the wound, which have not become occupied by blood, a continuous flow of this discharge goes on, in daily decreasing quantity, until by the shrinking and consolidation of the plastic material, aided by the contraction and compression of the surrounding tissues, this material fills up all these interspaces with firm new growth. This itself after a time becomes absorbed, but not always readily; and you will commonly find stumps which have recently healed somewhat full or rounded, and not seldom will you find the subcutaneous cellular tissue occupied by solid new material, which not only disappears slowly, but renders the stump incapable of support. What we find, then, to take place in the healing of wounds is that parts which are closely in apposition unite by immediate adhesion, while those that are separated by an interval, and lack support, unite by the effusion of material from the vessels, a large proportion of which, being fluid, is thrown off as discharge, and that the greater this interval, and the looser the tissue, or again, the greater the amount of damage done to the part by the operation, the larger is the amount of this discharge, and the longer does it continue.

Now, I do not suppose that any of you will pretend to think that this is a typical mode of healing. What is a typical mode

of healing? Do we not regard the absence of all discharge and primary adhesion of the wound surfaces, as you sometimes see in small cuts, as the *beau idéal* of the healing process? Cannot we do something more in our dressing of large wounds that their healing may imitate more closely this *beau idéal?* This is what, as intelligent beings, we have to aim at.

I have described to you the method which nature adopts to unite wounds which are held together by sutures and dressings as usually applied, and I have insisted especially on the fact that the discharges we are accustomed to see from wounds are due to the exudation of material into the cellular tissue, and into the loose vacant spaces between the surfaces of the wound. Now, I want you to understand and believe that this discharge is entirely unnecessary for the healing of wounds, and that were it not for the existence of these loose interspaces which I have mentioned it would cease to trouble us. This is the point which it seems to me we have forgotten in our daily surgical life, but forgetting which we have altogether missed the mark to be aimed at in our labours towards perfecting dressings. We have laboured to invent dressings which shall absorb the discharges; what we have to do is to devise dressings which shall render discharges unnecessary. Consider for one moment what it is you desire to do in arranging a stump after amputation. Do you not wish to place the entire wound surface in intimate apposition, and to maintain it so until it has adhered together? If this be so, you can imagine how little likely your ordinary dressings are to carry out your intention. You leave large spaces in the cavity of the wound, particularly at the angle where the bone is situated, and you leave loose connective tissue everywhere, both of which will quickly become occupied by effusion from the vessels. Clearly what we have to do to secure our end is to employ dressings which will exercise a sustained external pressure sufficient not only to bring the opposite surfaces immediately into contact, but also for the time being to obliterate the cellular spaces of the connective tissue, and to prevent the subsequent effusion of blood or inflammatory products. As regards the arrest of hemorrhage in this way, your every-day experience will remind you that it is easily enough accomplished, and we need not therefore pause to consider it. But as regards the prevention of inflammatory exudation by pressure some theoretical objections will probably occur to you. Remember, however, that we are not dealing with tissues already the seat of inflammatory disturbance, but with tissues in their normal condition, and that we seek to prevent even the first step in the process. That this may be accomplished by means of pressure, in certain cases, is evidenced by the treatment of fractures and sprains by the early use of judiciously applied compresses.

For some years past I have been endeavouring to dress wounds with the end in view which I have enunciated, and not to take up time with the record of failures, I find now that I have so far succeeded that I am justified in bringing my present method under your notice. I have found that by the use of sponge bandaged over the surface of the stump or other part one is often able to secure perfect union of a wound without discharge and without the need of changing the dressing until the union is complete and sound. Sponge, as you know, is a material which is readily compressible into a very small bulk, and which also possesses a high degree of elasticity or resilience, so that pressure being removed it immediately resumes its former size and shape. Besides this, its highly absorptive properties, which are commonly taken advantage of in surgical practice, are well known to all of you. For these reasons sponge appeared to be a material well adapted for the purpose I had in view, first and chiefly, to exercise a continuous and elastic pressure, and, secondly, to absorb readily any discharge which might perchance escape from the wound. The sponge I have hitherto mainly employed has been the large-celled honeycomb, and the manner in which I used it is briefly as follows. Antiseptic precautions are used throughout. All bleeding points are carefully closed. Frequent sutures are inserted, so as to bring the edges accurately together. No drainage is used. The sponge, having been soaked in carbolic lotion, is squeezed tightly to expel every drop of superfluous moisture. The flaps of the stump are meanwhile carefully pressed together by the surgeon in order to force out any blood which may have collected during previous procedures. And let me urgently draw your attention to this point, since want of thought about it will frequently cause disappointment. However carefully you may close all bleeding points in an amputation, in nine cases out of ten you will find that after closing the wound some further hemorrhage will have taken place. Possibly this may be from the surface of the flaps: very probably it may be from the needle punctures. But be that as it may, to leave this blood in the cavity is to court failure. Diligently compress the flaps together with your fingers, and so squeeze out every drop of blood; then relax not your hold for an instant, but skilfully place the compressed sponge over the surface, and hold it, and as many more sponges as may be required to cover the entire surface, tightly with your fingers, while an assistant secures them in place with a bandage. Sometimes this is rather difficult to do, but by stitching sponges together some assistance may be gained. The bandage having been applied, you may now cover the whole with antiseptic gauze, or with tenax, with a piece of macintosh over all; these again are secured with another bandage. In

many cases it is advantageous to use as a bandage a piece of elastic webbing. This you may do if you choose.—*Lancet, Oct.* 15, 1881, *p.* 658.

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## 42.—ON A SUBSTITUTE FOR CARBOLIC SPRAY.

By A. W. Mayo Robson, F.R.C.S., Lecturer on Pathology in the Leeds School of Medicine.

Most, if not all, surgeons acknowledge the advantages of the Listerian method of dressing wounds; and nearly all are equally unanimous in asserting that the spray, hitherto a necessity, is both inconvenient and dangerous. The surgeon has his vision obstructed, and his sense of touch impaired. He moreover has the serious discomfort of living during a considerable portion of his time in an atmosphere which treats him not quite so well as an ordinary Scotch mist would. There are many slighter inconveniences to patient, assistants, and surgeon, which are so well known that it is unnecessary to mention them here; but these are trifling when compared with the dangers to the patient attending the use of the spray, especially in abdominal surgery. That the risks of poisoning are not fanciful has, I think, been abundantly proved by Dr. Keith and other observers, who have been led to abandon the spray in ovariotomy. I believe I have myself seen death caused in more than one case of abdominal section by chilling of the viscera.

More than a year ago, an apparatus was advertised as a substitute for the spray, which created a current of air by means of a fan set in motion by clockwork, the air being forced through layers of gauze moistened with one in forty carbolic solution. About the same time I had an apparatus made which created a current by means of bellows, and sucked the air through two wash-bottles filled with one in ten carbolic solution. From some experiments I made at the time with sterilised flasks, I came to the conclusion that, although the carbolic air was pure or aseptic, it was not antiseptic. It then occurred to me that, if one could saturate the air with some more volatile antiseptic, such as oil of eucalyptus, cajuput, or peppermint, a really antiseptic air might be obtained, which, by being diffused in a room or blown on a wound, might answer the same purposes as the spray, without having its disadvantages. Unfortunately, I was prevented by other work from following out my ideas until last month, when I made the following experiments, in which I have been much assisted by my brother.

The first and most essential point to be proved was whether or not air impregnated with the vapour of volatile antiseptics

is really antiseptic. To ascertain this, I sterilised a number of flasks of hay-infusion by boiling for fifteen minutes, capping with cotton-wool, and boiling for five minutes longer; after which, to prove their freedom from life, they were placed in an incubator, and kept at a temperature of 100° Fahr. for two days. Having obtained some large wide-mouthed glass jars, capable of holding several gallons, I poured into one series about an ounce of eucalyptus-oil, and into another series the same amount of cajuput-oil, so as to have a thin layer of the fluid covering the bottom of the jar. Into these jars the sterilised flasks, previously freed from their cotton covering, were inserted; being suspended by means of thread from a bar placed across the mouth of the receiver. The transference and opening of the flasks were rapidly performed under carbolic spray; but, when once in the jars, there was nothing to interfere with the entrance and exit of the ordinary atmospheric air.

After a varying period of exposure of from two to twenty-two hours, the flasks were recapped with cotton, and again transferred to the incubator; in doing which the former precautions were adopted, and, in addition, the cotton which had to come immediately over the flask was moistened with a little one in forty carbolic solution, to avoid the contact of germs. After being in the incubator for two days, they were put aside to be examined at leisure.

No change occurred in the flasks through keeping, the hay infusion looking bright and transparent throughout; there was a slight sediment in all, both in those simply sterilised and in the ones subjected to the action of eucalyptus and cajuput; but in no case was there a formation of scum on the surface of the fluid. In contrast to this, some flasks that had been simply exposed to the air, and then covered with cotton-wool, began to appear opaque and have a scum on the surface within six hours.

In order that the report might be free from bias, I asked Mr. Abbott, an experienced microscopist and botanist, to examine the solution microscopically for me, which he kindly did, giving his opinion before I examined the slides.

The following are a few examples of the above experiment.

1. Hay infusion, sterilised August 18, placed in the incubator for two days; exposed to eucalyptus air for two hours on the 22nd; and then placed in the incubator for two days. Examined on September 7, and found to be absolutely free from living organisms, but to contain what appeared to be dead micrococci in the slight sediment.

2. Sterilised August 18, incubator till the 20th; eucalyptus air for thirteen hours, incubator till the 23rd. Examined on September 7, under a one-eighth object-glass, and found free from living organisms.

3. Sterilised August 20, incubator till the 22nd; cajuput air for twenty-two hours on the 23rd, incubator for two days. September 7, one-eighth objective revealed dead bacteria and micrococci, but absolutely no living organisms.

Numerous flasks, acted on in a manner similar to the above, were examined with like results, except in one case, where living bacteria and micrococci were found; this had had the usual precautions adopted, but failed from some cause. Curiously, in one flask, which had gone through the ordinary process and had been exposed to eucalyptus vapour, there was found a growth of penicilium, or some allied plant; but, as there were no living bacteria or micrococci, it would seem that this vegetable growth is capable of enduring greater hardship than its allies; but, as this is only one example, one cannot draw definite conclusions from it.

The experiments related above go far, in my opinion, to prove that, in the vapour of eucalyptus, cajuput, and other similar volatile fluids, we have powerful antiseptics, which, at the ordinary temperature of the atmosphere, may so saturate the air as to kill all infective particles; perhaps not only bacteria and micrococci, but also the germs of fevers and other infectious diseases.

In a chamber regularly used for operating, there would be no difficulty in having a large pair of bellows, worked by hydraulics, to pump a continuous stream of air, which might be carried to any part of the room by means of a flexible tube; the air having been forced through two or three wash-bottles containing pumice-stone and the volatile oil, cajuput or eucalyptus. If the end of the tube have a large bell-shaped opening, the current of air will diffuse itself over a radius of many feet.

I am at present experimenting with a portable apparatus having essentially the same principle as the above; but, as my instrument does not yet realise my expectations, I shall defer its description for a time.

Perhaps there may be no need for an apparatus, if it can be proved that the air of a room saturated with the vapour is freed from germs; for then, all that would be necessary would be to have some evaporating dishes, containing the volatile antiseptic, distributed in the operating chamber. In cold weather, or if the air will not absorb a sufficiency of the material, the current might easily be heated before passing through the wash-bottles; and, in the chamber, a little heat could easily be applied to the evaporating dishes. I hope, before long, to give some further results of trials with oil of peppermint, terebene, and other volatile bodies. — *British Medical Journal, Oct.* 15, 1881, *p.* 625.

## ORGANS OF CIRCULATION.

### 43.—ON THE SUBCUTANEOUS LIGATURE OF VARIX AND VARICOCELE.

By JOHN DUNCAN, M.A., F.R.C.S., Surgeon to the Royal Infirmary, Edinburgh; Lecturer on Surgery.

To appreciate the advantages of subcutaneous surgery, it is only necessary to compare a bruise with a bruised wound, a simple fracture with a compound. Antiseptics have done much to minimise the difference, but they are themselves irritants, and their use is subject to manipulative errors. The result, therefore, must be more perfect if, by operating through a wound, small and speedily healed, we can at once avoid the contact of antiseptics with a raw surface, and prevent the admission of septic influences.

So long, however, as the material thus embedded may cause irritation, either from its own nature, or from the conveyance of septicity in its texture, the wound is not in a rigid sense subcutaneous. There has, in this respect, been a curious variety of experience. On the one hand, the cutting short of the silk used for the ligature of arteries on the face of a stump has been tried, but abandoned on account of the frequency with which the knots suppurated out. On the other the intraperitoneal method of ligature has proved most successful in ovariotomy. The explanation doubtless lies in the fact that the human tissues are capable of neutralising or destroying noxious influences when not presented in overwhelming amount, and that, the healthier the tissue, the smaller the quantity of septic material, and the drier and less suitable the soil for its growth, the more certain is the action of this germicide power. But the introduction of a ligature capable of absorption and in itself harmless, has altered the nature of the problem; and experience has established the use of carbolised catgut, or some similarly prepared material. I have accordingly utilised it for subcutaneous ligature. It has not the elasticity or the strength which is necessary in nævi of large dimensions; but I have passed it with perfect success round one of the size of a walnut. The swelling slowly dwindled away, without suppuration, and with little tenderness. There are other diseases, however, in which it will, I think, be found more satisfactory, and of which the case before you is an example.

The treatment of varicocele always presents a certain difficulty to the surgeon. This disease is not dangerous to life, nor does it seriously interfere with ordinary functions and avocations; but it is a source of harassing if not severe pain, is a matter of solicitude to the patient, and in some cases leads to

wasting of the testicle. The former considerations have led some to recommend palliation by suspension, the vein-truss, and the cold douche; while the immense number of operative measures which have been devised, and which are not devoid of danger, bear witness to the importance of the latter. In the subcutaneous ligature by catgut we have a means of meeting the difficulty. It is singularly easy of application, free from risk, and very certain in its results. The mode of applying it is as follows. The veins are carefully separated by the fingers from the artery and vas deferens, and a needle armed with catgut is thrust through at the point of separation; it is again introduced at the orifice of emergence, made to pass between the veins and the skin, and finally brought out at the original entrance. The two ends are then firmly knotted with as much force as strong catgut will bear, and cut short. By traction on the loose skin of the scotum, the knot is made entirely to disappear, and the punctures are covered with salicylic wool saturated with collodion. The same manœuvre is repeated at a distance of an inch or a little more. I have now performed the little operation six times with complete success. In two cases, three ligatures were applied; but, in the others, to tie the vein at two points has been sufficient. The effect is the formation of a hard lump of coagulum between the ligatures, at first slightly tender, but which soon becomes perfectly callous. I have just examined a patient on whom I operated more than a year ago. He gives me the most satisfactory assurances of complete relief. A small hard nodule is still to be felt; the testicle is a little larger than its fellow; and the superficial scrotal veins are somewhat distended. But he feels no inconvenience, and has given up the suspensory bandage which he wore before the operation. The other cases have turned out equally well, and in one of them there has also been a year's probation. In two of them there had been previously some wasting of the testicle; but I hear that this has not as yet progressed further.

The success of the treatment of varicocele by this means induced me to apply it also in varix of the leg. So long as a varicose vein is not a source of inconvenience or danger to the patient, the general opinion seems to be that the use of the elastic stocking is all that is necessary. If that be not effectual as a cure, at least it prevents further deterioration. I should be inclined to say that, even in advanced cases, the stocking ought first to be tried; but when solid œdema and eczema and ulceration cannot thus be kept in check, or perpetually recur, some more radical measure becomes plainly desirable. There are also cases in which a limited portion of a single vein is greatly distended, and in which, although giving rise to little inconvenience at the time, it is, from its high situation, difficult

to control by pressure, and likely, therefore, to spread and increase. In such cases, if a radical remedy be simple and safe, it ought to be applied. Some have objected to all operations involving the obliteration of a vein, that there is a likelihood of others becoming varicose; and that the deep-seated varicosity thus induced is apt to be painful. But I am sure that must be rare. Undoubtedly the same causes which were originally at work may be allowed to continue their action in other veins through want of care; but it is not consistent with experience that, when one vein or set of veins is obliterated, others become varicose. On the contrary, veins on which backward pressure is thrown tend to varicosity; but parallel channels only enlarge and dilate. There is a long step between varicosity and simple dilatation. Large portions, for example, of the femoral vein often become obstructed in fever and other blood-diseases. The leg may afterwards remain permanently enlarged; but the veins are little more prone to varicosity than in the sound limb. But, even if such were the case, a problematical future evil would not justify abstention from what otherwise is beneficial; and the improvement that follows obliteration of a varicose vein is rapid and distinct.

The operation is performed precisely as for varicocele. The needle is passed first under the vein, and then between the vein and the skin, entering and emerging by the same punctures. It is not so easy to draw the skin over the knot after ligaturing as in varicocele; and this will be facilitated by slightly enlarging the puncture by means of a tenotomy-knife. When, as is sometimes the case, the limb is swollen and brawny, and the veins run, as it were, in gutters cut out of the solid œdema, the difficulty of operating is considerably increased. In such cases I have, as a preliminary, kept the patient at rest, and applied the india-rubber bandage for a few days. It is always of advantage, during the operation, to have the limb gently constricted by a bandage above the point of ligature, in order that the veins may be distended with blood, which afterwards coagulates.

I have now operated on eight patients with very satisfactory results, so far as obliteration of the veins and improvement in the condition of the leg are concerned. Perhaps, instead of going into the dry details of the cases, involving much repetition, I shall best fulfil my object of appraising for you the value of the operations by a few general remarks upon them. And, first, those of you who were present would notice that I performed the operation under the spray. I believe this may almost be regarded as a work of supererogation. Nevertheless, in dealing with veins, it is impossible to be too cautious, and it adds little to the difficulty or trouble. For the same reason, I

applied to each little puncture some layers of salicylic cotton and flexile collodion. I find this a most admirable antiseptic dressing for small wounds of all kinds. After carefully cleansing the wound with carbolised oil, the least irritating solution, I cover it with the wool and collodion, with the most perfect faith that, when the covering drops off, the wound will be healed. I have several times referred to points in the treatment of nævus. Let me do so once more. If a nævus be ligatured in the usual manner, it drops off after a little inflammatory action, and leaving a sore to heal. But if, after ligature with carbolised silk, it be covered with a broad shield of cotton-wool and collodion, when it is ready to come away (the period varying with the size), it will be found that there has been no suppuration, and that the wound has healed. It is a very perfect imitation of the method of healing under a scab. In subcutaneous surgery of all sorts, I therefore regard the application as one which adds distinctly to the certainty of success.

I find that some care must be exercised in the selection of the spots to be ligatured. A single ligature cannot be relied upon to obliterate a vein. To produce a permanent solution of continuity in the lumen at any one point, it is necessary to apply two ligatures, with perhaps an inch between them. Now, it is essential that no branch be given off between the ligatures. I have twice had to repeat the operation from, as I believe, not attending to this point. It is necessary also to study carefully the map of the veins which are varicose, and to ligature at judiciously selected places. In one intricate, but by no means unusual case, after double ligature at four separate spots, I found that a zig-zag channel of previous varicosity still remained, which I had not afterwards an opportunity of attacking. These difficulties, however, have to be met, whatever the mode of treatment; and, so far as my experience goes, they do not prove more troublesome with this than with other methods.

On one occasion, suppuration occurred at a ligature applied over the patella. It happened in this wise. The patient (who was afterwards dismissed for unruly conduct) got up contrary to orders four days after operation, and thus caused the dressing to loosen, and a little blood to flow from the puncture. It immediately inflamed. I expected to find the suppuration which followed septic; but, careful microscropic examination showed that the pus was quite free from organisms. It was, therefore, allowed to drain from the little puncture, under antiseptic dressing, and healed in three days.

These are the accidents I have met with in eight cases. Otherwise, there has been no general or local trouble whatever;

and, except in the incomplete case already mentioned, the success has been perfect.

It only remains to compare the operation with other methods—to consider which of the many modes of obliterating a vein is most certain and safe. Now, although excision of the whole vein is certain, it seems to me needlessly severe. You have, therefore, to choose between the introduction of a coagulant into the vein, its ligature, or its division.

Division of the vein subcutaneously is inefficient; the lumen is often reproduced. Division otherwise involves an open wound, and a risk of hemorrhage. External ligature may be performed by many ingenious contrivances, metallic and others; but to them also the same objection applies as to external division. The coagulants which may be introduced are, practically, two: perchloride of iron and carbolic acid. With due precautions in temporarily arresting the circulation, I believe there is practically little objection to be made to them. I have used carbolic acid with very satisfactory results, only once having had excess of action, and that from an error of procedure. I confess, however, to a lurking fear that, after the temporary ligature is removed, a clot might be carried off, with what serious results we know; and I am not altogether sure that the coagulum might not sometimes melt away, and the lumen of the vessel re-open. At all events, in the subcutaneous ligature, we have a mode of producing adhesion and a coagulum, which must be free from the former risk, and little liable to the second. I believe there are cases of hard and brawny limb in which it would be impossible to apply this ligature. In these cases, I should inject; but, in those to which it can be applied, we have no safer or surer treatment for varicocele and varix than the subcutaneous ligature with catgut.—*Brit. Med. Journal, July* 9, 1881, *p.* 37.

## ALIMENTARY CANAL.

### 44.—ON THE ETIOLOGY, PATHOLOGY, AND TREATMENT OF HEMORRHOIDS, OR "PILES."

By John Gay, Esq., F.R.C.S., London.

The study of hemorrhoidal swellings, or piles, cannot lead to any very satisfactory results unless based upon, and associated with, an exact knowledge of the venous system, not only as to its local or special, but its general or common, anatomy. Such a remark may be said to be trite; yet I cannot but think that there are treasures of fact concealed beneath our relatively slender and actual acquaintance with that system, both anatomical and physiological, that would, if realised, largely augment the sum of our practical resources in remedying the diseases that appertain to its various parts.

For any very satisfactory accounts of the anatomy of the vein system we have to go back to the works of Vicq d'Azyr, Walter, and Loder. Since these were published its study has gradually relaxed, so that now in our best works it is entirely disposed of in a very few pages, and the most complex and interesting of the phenomena appertaining to the circulatory system have had the smallest amount of attention bestowed upon them, whilst the simplest have exhausted whole volumes. Without such an amplification of the means of studying these curious products—piles—neither their *raison d'être* nor the anomalies of their clinique can be fully and satisfactorily explained. Thus portal congestion and allied hepatic affections have been held to be a constant source of disturbance to the currents in the hemorrhoidal veins, and therefore accountable for the diseases that befall them; and anatomy has been called upon to explain the etiological relationship. But clinical observation shows that the cases of piles traceable to hepatic disease are comparatively few; and in searching for their etiological antecedents the ground comes to be enlarged as we go, and with it the difficulty of tracing them to any common cause; for, as Mr. Allingham says, "they happen equally to the robust and the healthy, to the rich and the poor, the active and the sedentary," and I may add, without fear of contradiction, to the young and the old, to the abstemious as to the indulgent, and I think to the healthy as to the diseased, for I have seen them repeatedly in persons below the age of twenty who have led unimpeachable lives, and are otherwise without trace of disease—perhaps, most frequently in young married women; still, I have seen them in young people of both sexes. Gather together, if you will, the data of an extensive clinical inquiry, and, as regards *remote causes*, heritage will, I think, be found to take a very considerable part in the *rôle*; and as to *direct*, perhaps those modern usages of society which induce inaction in the lower bowels—sedentary habits, prolonged railway travelling, free indulgence in meat diet and highly alcoholic drinks, and that inattention to those calls of nature which "busy lives" are apt to disregard as of little consequence, compared with those of the mart, the field, the tennis lawn, and the ball-room, will go far to complete it. Thus modern customs have a tendency to exclude from use the means of counteracting those disordered actions and diseased tendencies which they are too apt to engender. There is no doubt, as Mr. Quain remarks, that sluggishness of the bowels aggravates, whilst their free action tends to relieve, hemorrhoidal malady. At the same time the converse also sometimes holds good, and diarrhœa has been known to be causatively associated with its production. If we take the anatomy of the hemorrhoidal veins, so far as it is known, the

relation of dilatation of their coats to portal obstruction is, nevertheless, to some extent obvious, and certain forms of "piles" may, in part, be thus accounted for. It might, indeed, explain some, but of others, such as those limited dilatations which are usually known as "external" hemorrhoids, it does not give so satisfactory an account. The hemorrhoidal, according to abstract or bare anatomy, form a portion of a vast pelvic plexus, in the formation of which other veins, such as the uterine, the vaginal, the vesical, the prostatic, and the spermatic, take their respective share. Together they constitute a network or congeries, and, as it occupies the lowest and most dependent part of the trunk and is very scant of valves, it would *à priori* seem impossible that there should be any disturbance in the larger branches or common trunks, causing reflux and peripheral blood-tension, that did not involve in its consequences more or less the whole of the series; at all events, that it should affect one exclusively. And this would seem to be still more improbable as the cause of disturbance, supposing, for instance, that it should be in the portal system, is so remote from the seat as more or less completely to cover the whole series. Such is not the case; and, as a rule, hemorrhoidal dilatations or piles are not found to co-exist with like disturbances in any of the neighbouring or even associated organic plexuses. I have not met with a case in which varicocele could be said to have been an etiological co-ordinate of piles, to whatever cause the latter may be traced; nor have I found any satisfactory evidence of the existence, with the worst forms of piles, of allied over-repletion of other vein systems. I have seen the hemorrhoidal and the vaginal veins very largely distended at the same time through the pressure of large pelvic tumours, or gravid uterus; but this result does not contravene the principle for which I am contending, that hemorrhoidal veins may be, and usually are, exclusively dilated or varicose. After injury to these veins, as by operations, retention of uterine, as everybody knows, is common, but it is clearly due to sympathetic and not to any compensatory act on the part of the vesical plexus. And, certainly, obstruction of the cava, below the confluence of the hepatic veins, does not produce piles, and if met in close contiguity to the heart, seems to find compensatory outlet for the pent-up streams rather in hemorrhage from mucous surfaces, varicosity of superficial trunk veins, or general œdema; so far, anatomy simplifies hemorrhoidal disorder.

But what are hemorrhoids or piles? Perhaps this question should have been answered before, as well as in anticipation of, what is to follow. I will, then, just state that they may be taken to include every form of dilatation, of which certain veins are susceptible, that is liable to become permanent by patho-

logical changes in the vein coats. And, as I shall endeavour to show, these changes are in conformity with like tendencies in certain homologous sections of the general system; and are, generally speaking, limited to two well-known forms—varix and varicosity.

Mr. Hunter seems to have dwelt on these disorders with considerable interest, as is clear, not only from the specimens that he collected and placed in his museum, but from his comments upon them. In his MS. cases in Surgery he remarks that piles would appear to be principally increased or varicose veins. "They are, however," he continues, "disease, and in this respect differ from the plexus retiform of the cavernous bodies, to which they assimilate, but only in this respect." Here there is seemingly an intuitive perception of the real nature of pile tumours, for Mr. Hunter does not appear to have gone beyond a superficial examination of them. In his collected specimens, the mucous membrane which covered the veins on which the piles are situated has not been removed in any case so as to expose them to close observation; and where they have been exposed *by section of the bowel or ulceration of the pile* they certainly do not generally exhibit that resemblance to the cavernous vascular tissue that Mr. Hunter speaks of. Lately, however, I have had an opportunity of dissecting some pile tumours, and in one or two cases have found this, what I shall term, trabecular variety. "The most singular thing," adds Mr. Hunter, "is the blood coagulating in them." In the specimen just alluded to, and in many others I have seen, the blood in the veins is coagulated. Thrombosis is, indeed, a very frequent condition of hemorrhoidally affected veins.

The several piles forming a ring or circlet often differ in size, and of two or more such tiers those of the lowest are usually the largest and most clubbed. Mr. Quain has given some excellent illustrations of piles in his work. In one, however, a bunch of pile swellings is seen protruding below the verge of the anus, whilst above the sphincter and *on the outer side of the muscular coats of the bowel*, dilated and somewhat tortuous veins are seen running upwards, as though their tributaries had passed through the sphincter and had been strangulated into pile swellings by its fibres. But Mr. Quain has given no indication of continuity between the extra-muscular veins and the intra-muscular piles, a point which I think it would be difficult by dissection to establish. At all events, I have not been able to find any evidence of such relationship. Both anal as well as rectal piles, indeed, all pile swellings, may become the seats of ulceration, which often perforates their coats, exposing loose or firm coagula within. The intra-rectal ridges or folds of mucous membrane to which I have alluded are equivalents of those

hypertrophied and warty-looking dermal appendages so often met with at the anal verge. These run more or less directly or spirally up the bowel from the rectal extremity. Some are loose and floating, but others enclose large or bloated veins or tributaries. In the former case the veins that formed the folds have retreated and are seen lying along at their base. During life in certain conditions of vascular excitement such veins are seen and give trouble, and sometimes even alarm, as they run along lazily beneath the mucous membrane, at times bloated and tense, well-nigh to bursting, losing themselves, however, in the main trunks above. They are usually transient, but might become permanent through hypertrophy of their coats. Such are the forms which piles assume in life on the undissected bowel.

I maintain that an analogy exists between rectal hemorrhoids and varicose disorders in the lower limbs, and have now to make good, if possible, the grounds on which I go still further and submit the existence of an homology between the special anatomical arrangement of the vein system in every part of the animal economy. And the general proposition, I submit, is—that as in the limbs so in the rectum, and, indeed, throughout the whole body, the vein system is, as I have often said, dual, consisting of a deep axial, or, in relation to structures, a muscular set or system of veins, and another, a collateral or compensatory system, which, in relation to structures, is dermoid or mucous. Veins of the first order contribute the channels which convey the steadily flowing or main streams, whilst those of the latter convey the rills which feed them. The first are bound within certain limits as to capacity, which they cannot easily exceed, and are liable to very little variation in their plans and respective courses, whilst the latter offer every variety in these respects, and have almost unlimited means of accommodation to contingencies, either by dilatation of their coats, or a thousandfold and more multiplication of their vessels if needed. These are typified by the saphenous, the former by the crural or femoral vein, whereas their mutual relations and interdependencies are everywhere the same. The *main* or *axial veins* are, in relation to the arteries, as a rule, comitial, whilst the *collateral* are solitary. The former of these have no outlet for the blood that has once reached them but by an onward or centripetal flow, and but very little permissive reflux; whereas the latter allow a considerable extent of ebb and flow movement, and by elaboration into a network of channels will permit the blood, as it were, to ramble on and delay its final absorption by the former or axial streams, until these are in a condition to receive it, often running long distances, even from the digital tips to the heart. Thus the risk of strained local blood-tension is averted, and uphill currents

are enabled to make their way against the most formidable obstacles to their destination. I can only refer to a special illustration or two of the subject I have thus entered upon.

Now, the upper hemorrhoidal veins belong to that class which I have just referred to as "main" or "axial," whilst the lower belong, in like manner, to the other—the dermal or mucous. Thus the former, the superior hemorrhoidal, as well as their allies, such as the uterine, vesical, prostatic, are in direct communication with the common iliac—an axial or muscular vein; whilst those of the lower hemorrhoidal and vaginal, the most prominent of this especial series, diverge into the portal through the mesenteric, and through these and the hepatic veins into the cava. Another set of veins is thus brought into prominence, to which no other import has been attached than that they belong to their own—viz., the portal, but which really belong to the compensatory or dermal, as homologous to the saphenous and the subcutaneous or mucous system generally.

Thus is it that in mammals, for the most part, as I learn from our best authorities, including, I think, Mr. Huxley, the axial or systemic veins transmit a portion only of the blood from the posterior segment of the body, and that chiefly from its muscular structures; whilst that from its corresponding dermoid textures passes into and through the azygoids, which, in some instances, receive a renal azygoid branch. Moreover, the azygoid system in the lower animals is said to be the outcome of the anterior *cardinal* veins, whilst the posterior become the innominate, and therefore a portion of the axial system. The hepatic portal, and the renal portal where it exists, as well as the veins of the chylopoietic viscera, must therefore be looked upon as veins of the dermoid or compensatory class, which, as they pass through important organs, not only have the same help from their retiform and capillary department that their transpelvic quasi-homologues have, but every other aid that can be given them in fulfilment of their transmitting function—*e.g.*, contractile vein force in some animals, and additional communication with the ductus venosus in others. Moreover, portal retrograde injection fills exclusively its tributaries, but these to the remotest venule; and I may add, *en parenthèse*, that, owing in great measure to the protective influence of Glisson's capsule, the portal veins are very rarely found obstructed in any degree from the most enervating forms of hepatic disease—such, for instance, as cancer or cirrhosis. (See specimen in the College museum.) In applying this view to the subject under consideration it will be seen that there is a free course for the blood of the hemorrhoidal affected veins, as well as that of their allies, back to the heart from the establishment of an abundant compensatory to the main system. It is, however, barely possible (although the

phenomenon is easily explained without this resource) that, from the portal as well as the renal system, disturbance to the *lower* hemorrhoidal might accrue. In such cases, however, it results in œdema, and in varicose disorder only then in accordance with the like consequences from analogous disturbance in the transpelvic limbs. And this is in keeping with what has been said with respect to the hemorrhoidal veins, which are strictly dermal or mucous, the blood of which passes through the liver, in part by the hepatic, and in part by the portal, veins, but in the greater through the hepatic lobular plexuses and the solitary veins (hepatic) to the systemic cava.

I cannot here enlarge upon this interesting topic; but it is capable of further illustration from the works of other writers (I allude specially to the Atlas of Klein and Noble Smith), from which I think it is tolerably clear that the hepatic and portal veins form a portion of the compensatory series to the cavæ, and are therefore functionally allied to the superficial veins, typified by the saphenous. The bearing of these remarks upon the subject under review is that there are no anatomical grounds on which hepatic disease or, indeed, disease of any of the organs of the trunk, interposed between the rectum and the heart, may be said to be specially favourable to the production of rectal hemorrhoids.

I now proceed to some remarks in practical application of the foregoing; but in order to do this I must summarise the main anatomical facts, upon which I design to base them. It is said that Copernicus died from hemorrhage through piles; an assertion which, whether it was really so or not, has gone far to brand this class of disease with a stigma it does not deserve. At all events, "piles" are not at all the more formidable on that account; and whatever forms they assume, it is rarely the case that they need be regarded as otherwise than comparatively trifling maladies.

The lower hemorrhoidal veins take the blood from the skin, in the vicinity of the anal outlet, and from the rectal mucous and related tissues, and, in passing, their primary streams traverse the extremely vascular stroma which I have described as the anal plexus; out of it venules take their rise. Now, these consecutive sets of veins, and the branches to which they lead, form the seats respectively of the several forms by which I have endeavoured to distinguish hemorrhoidal swellings. The existence of the first two is abundantly testified to in our museums, whilst that of the last derives its support chiefly from clinical observation, but is not wholly unsustained by other not less cogent, and even objective, proof. These forms of hemorrhoidal disorder may be classed, on the foregoing grounds, as—

(1) Anal or plexiform varicosity.

(2) Hemorrhoidal varix—saccular or erectile,—the true pile.
(3) Hemorrhoidal varicosity, or the varicose hemorrhoidal vein.

The first of these forms displays itself as a tense and well-defined welt, which, during life, appears as a well-defined bluish cord at the extreme verge of the anal aperture. As it is usually associated with "piles" of the second class, and lodges them within its areolar tissue, so these often give to it a slightly uneven or serrated contour. The swelling of the third variety occupies the larger hemorrhoidal branches, and betrays itself in those large bloated veins which are often seen, in hemorrhoidal persons, running up the bowel and bearing with them a very forbidding aspect. These are, however innocent, frequent in persons who are obese and otherwise of lax fibre and gouty diathesis. They are very liable to end spontaneously in thrombosis, and are usually the offspring of acute piles. In their ordinary course the hemorrhoidal currents have especial difficulties to contend with, such, for instance, as the feeble support which their vein coats receive from surrounding tissues, columnar pressure, and, it may be, from the want of that distributing function which valves in veins possess in relation to the blood. Still, under normal conditions, these impediments are readily overcome, and the course of the streams to the heart, through the hemorrhoidal as well as their cognate vein plexuses, is naturally made secure without risk of hindrance, except under exceptional circumstances. And this remark applies even to the smaller streams, the velocity of which is known to be very slight.

What, then, are the special circumstances which in these veins determine, and thus lead to, the several forms of dilatation by which they are so often beset? The pathological facts before us, without logically arranging them, render it, I think, obvious that it is due to forces which obstructively affect their currents, in opposition to those which propel them; and tracing the process physically by the same light, it is as clear that the first step is vascular, and lies in vein repletion—local hyperæmia—either from ordinary or extraordinary causes; whilst the second, in the absence of any proof to the contrary, is extra vascular, and can only be supplied by agencies, physical or physiological, usually combined, that are capable of acting upon the vein coats, so as to obstruct them. The first of these forces collect on the capillary or ventricular, whilst the second are supplied on the opposite or auricular side, the issue of the conflict being just at those points in the vessels where the resultant blood tension is in excess of their powers of resistance. The contour, size, &c., of the bulgings indicate the amount of force expended on their production, and show that it is much

less than that concerned in the production of aneurismal swellings, whilst their situation and distribution, especially the tier upon tier arrangement, one of their most common and characteristic features, point clearly to forces that act immediately on the veins athwart the normal course of their streams, and in a manner so as to give them the circular or gyrating form they assume. It follows then, that these forces are such as no other than those engaged in the act of rectal defecation can yield—viz., intestinal peristalsis with the aid of its co-efficients in that function. But superadded to these physiological energies there are clear indications of co-operative, intermediate, and subordinate agency in the form of matter passing through the intestine rendered passively potential by quantity and solidity, and not unfrequently by an abnormal state of its mucous surface. Difficult rectal defecation, then, is the most constant if it be not exceptionally the cause of these hemorrhoidal dilatations, and amongst the several agencies engaged, intestinal peristalsis takes perhaps the largest direct share in consequence of the peculiarities in its nerve endowments. Thus the distribution and relative excitability of the excito-motor as well as vascular filaments in the rectal textures are such that their functional activity becomes more intense as these are displayed in nearer proximity to the anal orifice. Hence it is that, in this situation, varices are found in greatest numerical abundance, and usually attain the largest size, whilst here also reflex action displays itself in greatest activity by the formation of those folds of mucous membrane which encumber that outlet, and which with pile and other appendages often become distressing from their tendency to protrusion, and the gradually lessening power of the sphincter to retain them.

I claim no credit whatever for these commonplace observations. My object in making them is to disengage one from the many integrals by which the etiology of piles is trammelled; and to show that not only is there no other that can explain its many, and often conflicting, semeiological elements, but that this one will answer the need, and best tally with both these and their pathological requirements. In concluding these observations I must premise what I have to say on the treatment of hemorrhoidal disease by the remark that the symptoms, together with the means of actual observation in these cases render their pathology a matter both of easy and certain inference. All hemorrhoidal disorder begins in vein coat dilatation from functional causes, which vary from simple congestion affecting the several sets of vessels involved to hyperæmic inflammation of their coats. These states, are of course, liable to be attended with such blood and textural changes as these conditions ordinarily give rise to. After, perhaps, several successive attacks

of this kind structural changes follow, and the disorder, from being acute and transient, becomes chronic and permanent, with such localised morbid results as I have attempted to delineate. But the veins thus permanently affected do not usually lose their proneness or predisposition to be attacked by those forms of sthenic disorder in which they began. This constitutes the *acute* stage of piles; a form of hemorrhoidal disease which often presents itself, and in which its acute and chronic conditions co-exist. This, indeed, forms a state of painful urgency, for which the patient usually seeks medical relief. The clear recognition of the symptoms due to each of these distinct forms of the disease, when in conjunction, is of great moment; for as the one is in its character variably acute but transitional, and the other is in the same respect chronic and permanent, the distinction for *practical* purposes serves an important end. I say for practical purposes; for, as a rule, the supervention of an acute attack upon chronic or permanent hemorrhoidal disease forbids, except under very rare circumstances, the employment of the special treatment that this special form requires; and as it not unfrequently happens that many of the more serious contingencies of chronic pile disease are the result of the accession of constitutional disorder, so the remedies that succeed in allaying or suppressing the latter will often, at least temporarily, in like manner affect the former. Hence the first notion of the treatment of these diseases resolves itself into *constitutional* or *local;* yet there are no periods during the adoption of remedies for one of its special phases that the possibility of its affianced complication should be lost sight of.

*Treatment.*—It is not my design here to treat or attempt to instruct as to the constitutional treatment of hemorrhoidal disease, especially of those forms which may be said to be acute (these are well understood), beyond saying that local bleeding, where local excitation runs high, by leeches, the complete unloading of the lower bowels, and opium are amongst the most useful of the means that can be employed.

I will turn now to what I have referred to, and is generally understood, as chronic hemorrhoidal swellings, such as result from structural changes, not always amenable to merely constitutional remedies. And of these that variety which is most common and is constantly met with, requiring local or surgical treatment, is that which I have termed varices—rectal and anal—in popular phraseology "piles." The two other varieties rarely require other than palliative and simple treatment; but should the involved tissues take courses similar to those which in the varicial form they so constantly observe, they will admit of being similarly treated. I have attempted to describe the processes of morbid and structural changes which "piles"

undergo, and their usual terminations—thrombosis, ulceration with perforation, and gangrene. By the first the course to further degeneration is usually arrested, and with respect to the individual varix or pile, a favourable ending is reached. And it generally follows that the disposition on the part of the blood to coagulate is communicated from that in which it begins to the blood for a more or less considerable distance through continuous branches, or even in parts of the vein system that are discontinuous, but, in like manner, affected. It is the actual "pile" tumour that requires explicit modes of treatment, and it is usually under hemorrhagic conditions only that it is likely to become formidable, and absolutely to demand it. The question then arises, What, according to their strict pathology, are the means best suited to command its arrest when bleeding occurs in these tumours? There can be no doubt, with an accession of rectal hemorrhage, especially with the objective evidence that each case at that stage invariably supplies, that it proceeds from a varix or pile, and not from chemosis from the mucous surface of the bowel. Moreover, it may proceed from one or several of a cluster of such swellings coincidently, whilst others of the same cluster show no disposition to bleed. Under no circumstances ought a pile that has once bled or shown a disposition to bleed to be allowed if possible to bleed again. What then are the best methods of dealing with it? These should simply be such as are selected for the suppression of hemorrhage through structural lesion of vein coats in any other parts of the body. On its occurrence its arrest should be promoted by raising the trunk; but in successive acts for its permanent suppression this is not actually needed, unless the flow is considerable and likely to become dangerous.

The actual stoppage of the bleeding should then, be accomplished by bringing every point that bleeds under the influence of some efficient therapeutical styptic or mechanical contrivance. As to these appliances it is not, I think, of much importance which should be selected out of the many that are commended, so that the one used will secure the object in view. Amongst styptics nitric acid and the perchloride of iron are most generally employed. In my opinion the latter, in the form of the tincture, is the most trustworthy, if applied upon the bleeding pile, as freed from moisture or dry as it can be rendered, and without stint or fear. Actual cauterisation by means of a needle heated by the benzine method, or the common cautery, is also an esteemed method in anal piles, and with the aid of Mr. Smith's clamp can, I think, be made effective and secure. On the whole, I must say I have preferred the ligature, which can be easily applied, and with efficient limitation, to the points actually requiring it, whether these include

the summit of the bleeding orifice only or the whole pile, which is generally preferable. By this method the injury to parts, not engaged in the hemorrhagic action and that give no offence, and with it all chance of further hemorrhage from the same source, are avoided. The method is very simple. There is no difficulty in everting every portion of the rectum in which bleeding from this source is likely to, or can, occur, and the result is unattended with the distressing and painful endurance which is the fate of patients under more heroic treatment for hours or days after, as well as prolonged convalescence.

But there is one other consideration which I beg to suggest to the profession, and upon which, from my owe experience, I have arrived at a conclusion satisfactory to myself, and this is, that the modern practices preliminary to pile operations are not commendable; but, on the other hand, positively prejudicial. I refer to the advised habit of what is called "bringing down the piles," by exciting exaggerated peristalsis, so that they can be more easily manipulated. This custom is not only objectionable, in my view of the matter, in a scientific view of the process, but is calculated, in the place of furthering the objects designed, rather to embarrass the operator in prosecuting it. Stimulating injections, and enforced peristalsis to the full extent to which it can be raised by means of local digital and even instrumental irritation, are usually employed for this avowed purpose. The end—i.e., the full exposure of the bleeding piles—might assuredly be otherwise gained without being accompanied by such excesses in the way of result as textural protrusion, free surface bleeding, &c., which not only obscure the diseased tissues, but disturb those ordinary conditions by the preservation of which, if possible, in a state of quiescence, surgical interference can be carried out.

There are few cases of chronic anal hemorrhoids in which lower portions of the rectal mucous and submucous tissues do not form themselves into more or less extensive folds, and protrude on being moderately irritated. Moreover, they become vascular, and often, like piles so situated, the seats of fissure, excoriation, and ulceration; and, extruded under such circumstances and by such means, a difficulty presents itself in distinguishing between the real and the secondary mock disorder. Thus large portions of tissues which bleed, under this kind of treatment, affect the appearance of hemorrhoids, and are consequently not unfrequently cut away unnecessarily and in great profusion. The treatment preliminary to operation should be confined to that which will place the patient in the best state of health of which his system is susceptible, and the parts in the utmost state of possible quiet, for the purposes of operation, and for some few days after operative proceedings.

I may just add that those dermal folds which so often make their appearance as life advances on the verge of and within the anus, and assume the form of thick, warty, or pendulous growths, sometimes of large size, are in nowise necessarily associated with piles; and that for them scissors are the fitting and best remedy.—*Lancet, July* 30, *Sept.* 17, 24, 1881, *pp.* 168, 496, 538.

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## 45.—ON AN OPERATION FOR THE REMOVAL OF INTERNAL PILLS.

By W. Martin Coates, M.R.C.S.Eng., Senior Surgeon to the General Infirmary, Salisbury.

I know of no more distressing affection, when it has become chronic. The pain and irritation, aggravated by constipation and defæcation; the exhausting discharges of blood; the occasional difficulty and pain in returning the tumefied and tender parts within the sphincter; and last, though not least, the depression that almost invariably attends this disease, cause an amount of mental and bodily suffering very sad to witness. When this affection has arrived at this degree, there is, as we all know, no cure but by removal.

There are now four recognised operations with this object: the old one, or tying in two portions, leaving the parts to slough away; a second, in which the mucous membrane is first snipped, and the vein alone is tied, which is much less painful; the third, Mr. Cusack's operation by the clamp and actual cautery, modified by Mr. Henry Smith, which is less painful than either, but is not so secure against hemorrhage. Of Mr. Pollock's operation, I have no experience; but, probably, the after-pain is not so great as in either of the first three. It was the terrible and continued agony which I witnessed from the old method of tying *en masse*, that induced me to long for, and, at last, to work out the operation which I venture to bring to your notice to-day. All the four operations at which I have glanced have one serious defect. They all leave open wounds, and Mr. H. Smith's a burnt one. All must heal by granulation; and, therefore, all are liable to hemorrhage, primary and secondary, and are exposed to the liability to septicæmia during the whole period of healing, which generally takes weeks, sometimes many, to complete.

My aim has been to contrive a cutting operation which would, while avoiding the pain of strangulation, sloughing, burning, or crushing, get rid of open wounds, protect the patients from the dangers of hemorrhage, and leave a simple linear incised wound, closed against irritation or poisoning by the septic contents of the intestines.

The instruments, &c., required are: two of Curling's vulsella,

my clamp, a tenaculum or hook, a pair of scissors curved on the flat, artery-forceps, some needles set in handles such as this, some ligatures and sutures of the finest carbolised catgut, a sponge, a solution of the strength of one part of carbolic acid in one hundred of water, and a suppository of two grains of powdered opium. My clamp is made of well-tempered steel. It is seven inches in length, having at one end a simple hinge, at the other a sugar-nipper fixing. The clamp proper is three inches in length, composed of parallel bars separated by a space of one-eighth of an inch. At the part nearest the handle are two shoulders, which prevent the blades from coming too near to each other, and so unduly pinching the living parts. The bars are a little over one-eighth of an inch in thickness, and are flat at their insides. (The clamp and needles are made by Messrs. Weiss, 62, Strand.)

Proceeding from the inside of one of the bars are eleven needles, about an eighth of an inch in length, and about an eighth of an inch apart. They, when the clamp is closed, fit into corresponding holes in the opposite bar. The handles, which are four inches long and of steel, gradually separate from each other until they become distant three-quarters of an inch at the fixing. The needles used for the stitches are stronger and more sharply curved than the ordinary needle of the sort, that it may turn closely around the clamp. The cutting edge, confined to the point, is parallel to the handle. The other part of it is round, that it may make as small a hole as possible laterally. This allows the operator to place the sutures much nearer to each other than he could have done with the edges at right angles.

These minute directions may be thought by some trivial and uncalled for, but not by experienced surgeons.

If the hemorrhoids have been brought outside the anus by a sharp purge, followed by an enema (as should be always done), those at one side of the anus can be seized, according to their size, by one or two vulsella. If they have not been extruded, or have returned within the orifice, they must be there sought, and brought down—a thing easily done. Great care should be taken to include as much mucous membrane as possible, *and no skin*. This precaution will make the operation much more successfnl and much less painful afterwards. The clamp is applied by separating the blades sufficiently widely to embrace the whole of the piles of one side, leaving sufficient space between the skin and clamp to allow the needles to pass between them without piercing the skin. The handles are now fastened, and grasped by the left hand of the operator, who thus obtains complete command of the part to be removed. The needles, armed with the finest

carbolised catgut, are passed one after another, at a distance from each other of an eighth of an inch, rather less than more, keeping the needles close to the clamp. The catgut threads are detached from the needles by the finger and thumb, by a tenaculum or hook, at the option of the operator, and given one by one to the assistant, who, with one hand above and the other below, presses them against either buttock, keeping the sutures separate. It may be remarked here, that one of the duties of the assistant is to retain the buttocks as separate as possible during the whole operation. The sutures being placed, and kept gently on the stretch by the assistant, the piles are cut off smoothly, quite close to the *outside* of the clamp, the blades of which should now be unfixed and slowly separated, and any pumping artery secured and tied with the finest carbolised catgut, which is cut off at about a quarter of an inch from the knot. The clamp is now removed, and the assistant brings the whole little wound into view by gently pulling upon the sutures. Search is again made for pumping arteries; and, if there be none, the edges of the wound are brought closely together by the sutures, cleansed by a sponge wrung out of a weak solution of carbolic acid in water (one to one hundred), dried, and painted with collodion or styptic colloid. A suppository of two grains of powdered opium is now introduced into the rectum; and the operation is complete. If there be piles at the other side of the anus, the process has to be repeated.

The after-treatment consists of the giving a grain of solid opium every six hours by the mouth, to keep the bowels quiet until the fourth day. On the fourth day, a dose of castor-oil is given, followed by an enema of warm olive-oil, which together produce an easy painless evacuation. No dressings are required beyond iced water for the first twelve hours, and then fomentations with a weak warm solution of carbolic acid (one in 150). The diet should consist, until action on the bowels has occurred, of milk and beef-tea, as leaving least residuum. The patient may be placed on a sofa on the day next after the operation.

I have performed it fifteen times; Mr. Harcourt Coates once. All the patients have done well, without hemorrhage or other trouble. In one only of the cases was it necessary to secure several arteries. This patient lost three ounces of arterial blood. In neither of the others was half an ounce lost, and in general no artery required to be tied. In three, one small vessel was tied. Venous oozing to a slight extent may be disregarded, as the sutures arrest it when they are tied. In my first trials of this operation, I used Chinese silk ligatures, and sutures, but of late the fine carbolised catgut. Since then, the pain

has been greatly lessened—I presume from the yielding of the material from moisture. As might have been and was anticipated, the pain and retention of urine were reduced to a minimum. The former never lasted over twelve hours, and was sometimes so slight that one private patient got up contrary to orders on the day of the operation, and another (an infirmary patient) was caught by me making his own bed on the day succeeding it.—*Brit. Med. Jour.*, *Aug.* 27, 1881, *p.* 350.

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## 46.—ON THE TREATMENT OF CANCEROUS ULCERATION OF THE TONGUE.

By Christopher Heath, F.R.C.S., Holme Professor of Clinical Surgery, University College, London.

*Cancerous ulceration* of the tongue is of the epitheliomatous type, unless it should supervene in the later stage of scirrhus, which is of rare occurrence in the tongue. Attacking the side of the tongue, in patients over forty years of age, the onset of the disease is so insidious as to attract little attention, the ulcer being often attributed (and perhaps correctly as to origin) to the irritation of a tooth. When well developed, the ulcer is usually oval in shape, with sharply cut edges, and a marked induration beneath it when the parts are grasped by the finger and thumb. The pain of cancerous ulceration is a well-marked and early symptom, being lancinating and acute, and shooting up into the ear. The irritation causes a great flow of saliva, and the tongue is moved with difficulty. at first because of the pain produced, and later on because it is bound down by the infiltration of all the structures. The submaxillary lymphatic glands become involved early in the disease, being at first swollen and tender, and later on being apt to suppurate and break down, causing large openings beneath the jaw.

Should the disease spread towards the base of the tongue, death is occasionally due to hemorrhage from one of the lingual arteries; but, in cases where the anterior part of the tongue is involved, it not unfrequently becomes adherent to the incisor portion of the lower jaw, and ultimately infiltrates that bone. In these cases, the patient has generally a longer life of great misery, and dies at length, exhausted by pain and discharges from numerous open sores about the chin and angles of the jaw.

In the treatment of epithelioma of the tongue, all surgeons of experience are agreed as to the inutility of medication, whether topical or general, and the advisability of early and complete removal of the disease. A recent discussion at the Société de Chirurgie of Paris (Medical Times and Gazette, Jan. 8, 1881), has shown that all the leading surgeons of that city are

agreed with those of other countries, that the administration of iodide of potassium in true epithelioma is useless, and that the constant application of nitrate of silver is harmful. The difficulty in practice is to induce a patient to take a sufficiently grave view of his case at an early stage, when an operation may be undertaken with advantage and with a fair prospect of relief, prolonged if not permanent. In the later stages, when the lympathic glands are involved, it becomes a question whether any interference is advisable, and many surgeons would refuse an operation; but it appears to me that, in many even of the worst cases, temporary relief may often be given by operating, provided the patient is prepared to run the immediate risk of the proceeding, which is undoubtedly great; and Mr. Stokes of Dublin has recently brought before the Clinical Society of London cases in which he removed enlarged and infiltrated lymphatic glands with good results. Still, life prolonged in misery is worse than death following close upon the operation, and I have been thanked more than once by dying patients for having given relief during the few days for which they survived the operation. Anæsthetics have robbed operations of so much of their horror, that patients may now-a-days be induced to submit to extensive mutilations, which would have been impossible, or at least unadvisable, without chloroform. Chloroform is necessarily the anæsthetic to be employed in operations upon the tongue, for ether is inadmissible; first, because of the difficulty of keeping the patient under its influence when atmospheric air necessarily gains free admission; and secondly, because if, as often happens, a cautery is required in the course of the operation, a dangerous explosion and conflagration in the patient's mouth may be caused by the inflammable vapour of the ether.

Ligature of the lingual artery has been advocated both by Demarquay and Moore (Medico-Chirurgical Transactions, vol. 45), in order to check the growth of cancer of the tongue, as well as for the arrest of hemorrhage, but has not yielded the results anticipated. I have on two occasions tied the lingual artery, once for hemorrhage occurring in the course of a case of cancer, and once with the view of checking the growth, which was rapidly extending; but in neither case did the ligature appear to have any influence in staying the course of the disease.

Division of the lingual nerve is another palliative operation recommended by Hilton and Moore; and this certainly is efficacious, for a time at least, in relieving the pain of a cancer involving the side and tip of the tongue. The operation is not a difficult one, and has the negative advantage of doing no harm, if it effects little good. The operator feels for the mylo-hyoid ridge of the lower jaw, immediately below the last molar

tooth; and a sharp-pointed curved bistoury, pushed through the mucous membrane at this point, will readily divide the nerve against the lower edge of the ridge, with little or no bleeding. The side of the tongue will be thoroughly numbed for some days, and then sensation slowly returns from union of the divided nerve, when the operation may be repeated.

Removal of portions of the tongue with the knife is an operation which has fallen into disuse, owing to the hemorrhage ordinarily accompanying it. Sir William Fergusson, who advocated the practice, and who thus removed more than one-half of the tongue in the case of the late Dr. John Reid, maintained that the fear of hemorrhage in these cases was exaggerated; and in his account of that particular operation (Practical Surgery, p. 517), says: "The bleeding for a minute or two looked formidable; several vessels were speedily secured, and there was no further trouble in this respect." It must be noted, however, that the operation was performed without an anæsthetic, the patient being a man of great moral courage and physical endurance, and that only one lingual artery was divided. With an unconscious patient, in whom both arteries have been divided far back, I have seen the very greatest difficulty arise in securing the vessels, which play across one another, and obscure the operator's view in the dark cavity of the throat.

In such cases, and in cases of secondary hemorrhage after removal of large portions of the tongue, I have found that it is practicable to arrest all hemorrhage in the following way. The forefinger, passed well down to the epiglottis, is made to hook forward the hyoid bone, and drag it up as far as practicable towards the symphysis menti. The effect of this is to stretch the lingual arteries so as to completely control for the time the flow of blood through them; and in this way portions of the anterior part of the tongue may be cut off almost bloodlessly.

The ligature formerly used for strangulating portions of the tongue has fallen into disuse, because of the practical difficulty of keeping it sufficiently tight to ensure continuous strangulation of the part to be removed, and also because of the suffering caused by a sloughing mass of tissue in the mouth. It is, unnecessary, therefore, to consider the various modes devised for applying the ligature in former years.

The écraseur has been extensively employed for removal of portions or the whole of the tongue with very satisfactory results. The wire écraseur answers the purpose better than the chain instrument at first employed, in which portions of the tongue were apt to be twisted up. In order to effectually remove a diseased portion of tongue with the écraseur, it is necessary to isolate the growth by pushing well beyond it curved needles set in handles, around which the wire of the

écraseur may be passed, and thus be kept in its proper position. Without this precaution, the wire as it is tightened is certain to encroach upon the disease, and lead to an incomplete operation, and no forceps is sufficient alone to obviate the occurrence.

The galvanic écraseur, used in the same way, has the advantage of cutting more readily through the tissues, which it sears at the same time, thus preventing all hemorrhage at the moment. It has, however, the drawback, that the separation of the slough necessarily formed by the cautery is very apt to lead to secondary hemorrhage some days after the operation, and hence its use has been abandoned by many surgeons who formerly employed the galvanic écraseur.

Paquelin's thermo-cautery is a very convenient instrument for removing small portions of the tongue, since it is not necessary in using it to pass pins beyond the growth. It is liable, however, to the same drawback as the galvanic cautery, of secondary hemorrhage.

Removal of one-half of the tongue is an operation yielding satisfactory results, and comparatively easy of performance. It was recommended by Dr. Buchanan of Glasgow, who, however, divided the symphysis menti, a complication which is unnecessary in the majority of cases, as shown by Mr. Morrant Baker (Lancet, 1880, vol. 1). A thread being passed through each side of the tip of the tongue, and the mouth gagged, the operator divides the frænum linguæ and subjacent muscles with curved scissors, which he runs along the floor of the mouth on the diseased side so as to divide the mucous membrane near the jaw, as far back as the disease reaches. Taking one thread in his left hand, and the other being held by an assistant, the operator then, with a blunt-pointed straight bistoury, divides the tongue strictly in the median plane, being particularly careful to divide the tough corium of the dorsal aspect well beyond the disease. Any bleeding vessel on the surface of the section is easily seen and secured, and with the forefinger the operator then tears through any remaining muscular tissue of the tongue or sublingual tissues, so as to isolate the half of the tongue to be removed. The wire loop of the écraseur can then be easily slipped over the apex of the tongue to the base, through which, if necessary, needles may be inserted, and the diseased half of the organ can be removed as far back as may be necessary.

Should the disease be so extensive as to require removal down to the hyoid bone, it may be necessary to resort to the plan suggested by the late Mr. Collis of Dublin, viz., to lay open the cheek by a horizontal incision carried from the angle of the mouth. This would, of course, bring the parts more thoroughly into view, but with the drawback of increased

hemorrhage and permanent deformity. By employing an écraseur with the end slightly curved, I have, however, been able, in several cases in which I have removed half the tongue, to dispense with any external incision.

Removal of the whole breadth of the tongue may be readily performed with the écraseur, when the disease involves only the anterior portion of the organ ; but, when it extends further back, free division of the sublingual tissues, as recommended by Sir James Paget, will be necessary, in order to allow the satisfactory application of the wire loop to the base of the organ. Mr. Baker has recommended that, in cases of entire removal, the tongue should be split, and the two halves be removed by écraseurs simultaneously; and the two methods are, for all practical purposes, identical.

Nunneley's method of applying the écraseur for removal of the entire tongue is as follows. An incision is made in the median line between the chin and the hyoid bone, and is carried up between the genio-hyo-glossi muscles into the mouth; and the chain of an écraseur is carried through this. The base of the tongue being thus transfixed from above downwards by three pins, the chain is passed behind them, and the écraseur is worked from beneath the chin. The objection to this method is, that the tongue is necessarily cut obliquely, notwithstanding the use of the pins. Its advantage is, that a useful drain for discharges is maintained from the floor of the mouth.

Mr. Barwell (Lancet, April 19, 1879) has modified Nunneley's method by making a small suprahyoid wound, and carrying a thread into the mouth, by means of a handled needle, much farther back than in the older method. The needle is made to enter the mouth close to the last molar tooth on each side, and the wire of the écraseur is drawn by the thread through the suprahyoid wound and round the base of the tongue. A handled needle is then passed from before backwards through the tongue at the point where the section is to be made, and the wire slipped behind it. When the tongue has been divided vertically, a second écraseur is applied horizontally in the mouth, to divide the sublingual tissues which have been left. Mr. Barwell claims for this method that it leaves a painless stump, because the lingual-gustatory nerves are divided close to the lower jaw ; but this result is not peculiar to this particular operation, which does not appear to possess any special advantages over that of division of the sublingual tissues before the section of the tongue ; whilst, if hemorrhage should occur on completion of the section of the tongue, the organ itself would be very much in the way of the application of a ligature.

Mr. Barwell has introduced into practice a form of wire for the écraseur, which promises to be very serviceable. It con-

sists of a strand of Newall's patent wire-rope, made of untempered steel, with a thread in its centre, and is more flexible than any steel wire.

Regnoli, in 1838, devised a submental operation, by dividing the floor of the mouth close to the lower jaw from one facial artery to the other, so as to allow the tongue to be drawn down and fully exposed. It may then be removed with the knife or écraseur; but, if the knife be employed, care should be taken to divide only one lingual artery at a time. I have assisted in the performance of this operation more than once; and I think that for slight cases it is an unnecessarily severe proceeding, and has no advantage over the intrabuccal method; while for the more serious cases, in which it is necessary to go close to the hyoid bone, it has the drawback that the surgeon is working in a hole, where it is very difficult to see and secure a bleeding artery.

Sédillot and Syme were the first to divide the lower jaw in order more thoroughly to extirpate the tongue. The operation is a very severe one, but affords the only satisfactory method of dealing with cases of extensive disease of the tongue, in which the floor of the mouth is involved.

An incision in the median line of the lower lip, prolonged to the hyoid bone, will allow of the dissection of the lip from the lower jaw for about a quarter of an inch on each side. With a drill, the bone can then be perforated on each side of the median line, and about midway in the depth of the jaw, so as to admit of the two halves being subsequently drawn together with wire. The jaw is then to be divided exactly in the median line with a fine saw, which may advantageously have its handle raised above the level of the blade, so as to be out of the way of the patient's chest. The advantage of dividing the bone in the median line is, that the teeth are not interfered with; whereas, in Sédillot's method of dividing the jaw by a > cut, it is necessary to sacrifice all the incisor teeth. In addition to the wire employed to bind the halves of the jaw together, the action of the muscles tends to maintain the parts in relation, and to press the halves of the jaw together, rendering the notching of the bone an unnecessary complication. If the vertical section be completed with the bone-forceps when about half the thickness of the bone has been divided with the saw, the slight irregularity thus produced assists also in maintaining the parts in apposition. The halves of the jaw being held asunder with hooks, the operator cuts the genio-hyo-glossi muscles from the jaw with a pair of scissors, leaving the attachments of the genio-hyoid muscles. With the forefinger and scissors, the tongue can then be dissected up from the floor of the mouth with the sublingual glands and mucous membrane until the hyoid bone

is reached; firm traction being made with a stout string passed through the tip. The tongue being then drawn down, the palato-glossi muscles forming the anterior pillars of the fauces will be put on the stretch, and must be divided with scissors, after which a handled needle should be passed through the tongue close to the hyoid bone, around which the wire of the écraseur should be passed.

The surgeon should be prepared with a handled needle and stout thread to transfix and hold the small remnant of tissue left attached to the hyoid bone, should the breathing be embarrassed by the epiglottis and base of the tongue falling back. In my experience, this is much more likely to happen when a considerable portion of the tongue is left, than when the section is made far back; and the difficulty seems to arise from the weight of the piece left forcing back the epiglottis when the sublingual muscles have been divided.

All hemorrhage having been checked, the two halves of the jaw are to be brought together with a piece of stout silver wire. This may be passed from before backwards readily enough through the hole in one side of the jaw; but it is not easy to pass it back again on the opposite side, unless a loop of thin wire be passed from before backwards through the hole already made, into which the end of the wire can be bent, and thus drawn forward. The two halves of the jaw should be brought into close and correct apposition, and the ends of the wire twisted and brought up beneath the lip. The lip is then to be brought together with hare-lip pins and a fine silk stitch in the mucous membrane; but care should be taken to leave the lower part of the incision open, so that there may be a free drain for the saliva and discharges from the mouth. In removing the wire from the jaw at the end of three weeks or more, it will be found convenient to cut the wire close to the jaw on each side, and then with a blunt hook to pull out the loop from behind.

When the disease involves the anterior part of the tongue, it is by no means uncommon to find the organ adherent to the incisive portion of the jaw, and the bone more or less infiltrated, as shown by the loosening of the teeth and softening of the bone. Under these circumstances, it is necessary, after clearing the bone, to apply the saw on each side of the diseased portion as far from the median line as may be necessary to reach healthy bone. After removal of the portion of bone with the diseased tongue, it is quite useless to attempt to wire the remaining portions of jaw together, since it is impracticable to draw them into apposition at the time. And yet it will be found in a few weeks that, as the wound heals, the two sides of the jaw are gradually approximated by the action of the muscles, and will eventually, in many cases, unite firmly. (For cases, see Lancet, 1876, vol. 1.)

In all operations for removal of the tongue, it is well to be prepared for unexpected hemorrhage, which may be very urgent. Blood collecting in the pharynx may embarrass the breathing very much, and, by the congestion produced, may keep up venous bleeding. Under these circumstances, it is well to perform laryngotomy at once; and, if blood have entered the lungs, as is very apt to happen when the tongue is dragged forward, to suck out the blood through the tube. I have twice seen patients rescued from imminent danger of suffocation in this way, ultimately making good recoveries.

With the view of obviating all risk of suffocation during the operation, and also to facilitate the administration of the anæsthetic, recourse may be had, before commencing the operation of removal of the tongue, to laryngotomy or tracheotomy and the use of Trendelenburg's tampon. This consists of an India-rubber tube covering the tracheal cannula, which can be inflated so as to plug the trachea and prevent the admission of blood; but an equally satisfactory method is to plug the pharynx with a sponge, to which a string should be attached. A flexible tube attached to the ordinary tracheal cannula allows the ready administration of chloroform-vapour. I have employed the method on one occasion, and have seen it employed on others; but it appears in most cases to be an unnecessary complication.

The after-treatment of cases of removal of the half or entire tongue consists in maintaining the strength of the patient by judicious feeding, and in keeping the mouth sweet. Feeding is best accomplished with the ordinary earthenware feeder, having a spout to which an india-rubber tube may be fitted, if it be necessary to carry the food very far back. In this way, sufficient milk, beef-tea, and brandy may be administered until the patient prefers to take nourishment from a cup, which he does often earlier than might be expected. Should the feeding by the mouth be insufficient, recourse should be had to nutrient enemata.

With regard to cleanliness and prevention of fœtor, it is very desirable that, at the time of the operation, all divided tissues should be thoroughly mopped with a forty-grain solution of chloride of zinc, which not only obviates fœtor, but tends powerfully to prevent the absorption of septic matter.

The frequent washing out of the mouth with a lotion of permanganate of potash or lime (the latter by preference) is most readily accomplished with a syphon-douche fitted with a soft india-rubber nipple, which the patient can direct himself, without risk of hurting the mouth. After each washing, the mouth should be brushed out with the glycerine of carbolic acid or "terebene," either of which answers admirably in preventing fœtor.—*British Medical Journal, June* 18, 1881, *p.* 953.

## ORGANS OF URINE AND GENERATION.

### 47.—REMARKS ON MODERN LITHOTRITY, AND ON THE INSTRUMENTS USED FOR ITS PERFORMANCE.

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My object in the present communication is to show in what the modern operation of lithotrity consists, and to explain the instruments which have made its performance possible; for the removal of a vesical calculus through the urethra is now mainly a question of apparatus of which certain essential details are new. And as it is by no means necessary that the different parts of the apparatus should be put together exactly in any particular manner, it will be perhaps better to illustrate the principles of its construction than to insist on any special form of it. It will also be unnecessary for me to dwell on those parts of the subject which belong as well to the old lithotrity as to the new.

From the days of Civiale to the year 1878 there was little change in the operation. The duration of a sitting was as brief as the skill of the surgeon, stimulated by his fear of producing cystitis, could make it. Three minutes or less was the limit inculcated by standard books and the teaching of specialists, and the use of anæsthesia was exceptional. At present anæsthetics are the rule. The instruments have been already modified in an important manner, while sittings often last half an hour, and have been successfully extended to three hours and more.

Had Clover (whose catheter had a calibre only 21 of the French standard—about 12 English) or Mercier employed larger catheters (between 25 and 31 French—15 to 20 English), they might have evacuated the bladder completely. They would have found how little affected it was by a long operation if no fragments were left behind, and that polished instruments were not injurious to it while sharp fragments were. They would have discovered a *tolerance on the part of the bladder* wholly at variance with the traditions of half a century. Upon this tolerance modern lithotrity is based.

The new and essential instrument of the operation is *the large catheter* (25 to 31) whether straight or curved. This is indispensable. It has an orifice at the extreme end, one side of which is prolonged so as to make its introduction easy. It has been adopted with little or no change, so far as I know, everywhere. Although my first apparatus was provided with efficient means of suction and a detached trap, neither of which was used before, its distinctive feature was the large catheter. The small

size of the previous evacuating catheter delayed surgical progress for half a century. All the fragments could not pass through it, and it was impossible for surgeons to ascertain how the bladder would behave when once completely emptied of all fragments.

Assuming all this to be admitted, let us examine the rest of the apparatus, and see how the operation is modified by it. As even a single minute fragment left in the bladder may be the nucleus of a future stone, it is important to get rid of it with certainty, and once for all. Now, although a fragment remaining in the catheter, after the bulb has ceased to expand, goes back to the bladder, yet if it has once passed beyond the catheter its return to the bladder ought to be made impossible —the surgeon should be able to secure it. And yet no evacuator hitherto devised, whether with a long or a short connexion between the bulb and the catheter, accomplishes this important end. They all inject fragments from the apparatus back into the bladder. I find by experiment that a few added inches of elastic tube make little difference. *It is from the bulb or bottle that fragments are chiefly returned, before they settle into the receiver, and not from the tubes.*

To prevent this I have fixed a simple contrivance to the head of the catheter, which is absolutely effectual in securing every fragment as it comes through it. It consists of a small light glass cylinder, containing a ball-valve of rubber acting noiselessly, the valve seat of which is perforated so as to strain the return current and to keep back any fragment that has once passed it. Such a *catheter-valve* or *strainer*, to which I alluded in my first paper (1878), is, I think, nearly as important as the large evacuating catheter itself, of which it may indeed be considered as a part.

The rest of the apparatus admits of endless variations, which are less important.

If to the essential large catheter and trap we merely attach a strong elastic bulb, we have an excellent and simple instrument for a short washing or for sounding for a last fragment. I have called this an evacuating sound. No fragment drawn by it from the bladder can get back. This apparatus resembles Clover's, which was the first of the straight variety. It differs from it in having a large catheter, a valve or strainer, and a stiff bulb, all of which are either necessary or important to success.

One of the early additions to my own first instrument with which, in its original form, Thomas Smith successfully evacuated nearly two thousand grains of débris, was a hose. This contributes greatly to the convenience of the operation. When, for example, at each aspiration of the bulb, the wall of the

bladder is drawn with a painful jerk, or series of jerks, into the orifice of the catheter, evacuation is obstructed. More water is then needed to distend the walls. This is conveniently supplied by a small hose attached to the top of the bulb. Should the patient strain or vomit, and the bladder be forcibly distended in consequence, we have here a means whereby the superfluous water can be quickly removed from it. When air rises to the top of the apparatus from the empty catheter or a leaky joint, it can escape by this hose and be replaced by water. Valves in the hose itself, or in the vessel into which it delivers, allow the bloody water to be changed for fresh. By its means the amount of water can be regulated, and the operation becomes a dry one, while the apparatus is as simple as a common enema syringe.

I have made a convenient straight evacuator out of the evacuating sound by attaching to it a light receiver, like that of a breast-pump, close to the catheter, adding also a flat strainer at the entrance of the bulb, to keep the fragments out of it, and a hose to manage the air and water.

The straight apparatus is much the best, in the distribution of its parts, of the evacuators wholly supported by the hand. The centre of the bulb is in line with the catheter, and were it not so heavy when full of water it would be a most convenient handle for the management of that instrument. In short, if the operator prefers to carry the bulb, unsupported in his hand, straight instruments, such as have been described, are the best. But I prefer a support or stand of some sort. If a flexible tube or joint is interposed between the bulb and the catheter, the former can be supported upon the patient, or on a stand at a height corresponding with the inclination which the prostate gland gives the catheter, while the latter has a free and independent motion. Such is the instrument I use for any considerable evacuation.

It is no great matter where the catheter enters the wall of the bulb, but it should finally deliver inside at some point lower than the top, so that any air can rise out of the way. Mr. Berkeley Hill was quite right also in saying that the catheter should not deliver into a narrow part of the apparatus where fragments are crowded together, because then they go back to the bladder. It is the worst place, although if a valve or strainer is used the defect is less important.

But let me repeat it, a proper catheter to deliver the fragments with an effectual contrivance to prevent their return, are the essential parts of the new apparatus; the rest is a matter of convenience or perfection, and every operator can choose the arrangement which suits him best. *When the instrument is imperfect, the fragments will go backwards and forwards; but they*

*always leave a certain number outside. The evacuation will be accomplished in the end by every evacuator that has the large catheter, which is the key to modern lithotrity.*

What has been said about the evacuator, an instrument which has been of late years so modified as to make it a chief factor in the operation of lithotrity, is intended rather to illustrate the principles which should guide the surgeon in its construction, than to recommend any particular one. For although the instruments I showed at the Congress, and which I have described here, and use, accomplish the work of drawing out the fragments and preventing their return more perfectly than any previous apparatus for the purpose, this is not the only consideration which always in practice determines the surgeon in the choice of such an instrument.

I now recommend an evacuator on the ground of simplicity in construction and economy in price. It works quite well enough with or without a stand. It is, in fact, the instrument already described, with a strainer substituted for the valve. Several instruments shown by me were provided with strainers, but this one is arranged with reference to the fact, that the return of fragments from the apparatus to the bladder is much greater from the bulb than from the tubes, to which it has been erroneously attributed. The strainer is here a perforated cylinder added to the catheter, passing inside the bulb, and extending nearly across it. Through this the fragments are drawn into the bulb-cavity. They swirl there for a few seconds, but when the water goes back to the bladder it strains them off, and they fall into a receiver. The lengthened tube adds little to the amount of the returned débris, and if obstructed is easily cleared by a rod.

*Lithotrites.*—Within three years renewed attention has been given to the lithotrite, which was supposed to be beyond improvement. A calculus may indeed be crushed by any lithotrite, if strong enough. But since decisive crushing has become more desirable, and the limit to the size of the stone has been extended, different lithotrites are more and more used for different stones. The old lithotrite, the combined work of Retoré, Costello, Charrière, and Weiss, underwent little change in half a century. A most convenient addition to it is the long handle described by Thompson. It gives a better hold for the left hand. But the inconvenient button in the lock of Weiss, which it encloses, has never been changed. The thumb and the eye of the operator must search for it when the instrument is turned. By changing the lock a little I have been able to replace this button by a more convenient ring, which the fingers cannot miss. To reach this ring-lock with the fingers, after the stone is seized, requires neither practice nor attention, while one or both are needed with the Weiss's button.

The easiest movement of the right forearm or hand is rotation from left to right—supination. I have adapted the locking of my lithotrite to this motion. An instrument which can be thus locked and unlocked has this superiority, that not even the fingers of either hand relax their grasp until the stone has been screwed down between the blades. No other lithotrite gives the surgeon this advantage. This lock is attached to the usual American instrument, and I have lately further improved it.

We may laboriously educate the movements of the hand to the piano, the violin, or some especial lithotrite, but we cannot alter them. That instrument is the most convenient which, in accomplishing its object, is best adjusted to the easiest movements of the hand. Workmen may become, indeed, proficient in the use of any form of instrument; but the skill of the Japanese wood or metal worker, which is unrivalled, is not evidence of the convenience of his tools, which are rude.

In the Lancet of Nov. 2, 1878, p. 616, I pointed out the advantages of certain lesser modifications of the usually accepted lithotrite, partly new and partly not. Among these were, besides the increased calibre of the jaws, a large opening at the heel of the female blade, into which the flanges of the male blade projected so as to drive out the débris and prevent impaction where it is likely to be greatest; jaws as much at right angles with the stem as can be safely introduced, whereby their efficacy is increased; a thicker toe to the female blade, elongated to prevent the bladder from being seized by the closing blades, and well rounded off to facilitate its introduction; a ball or larger wheel or handle, instead of the classical narrow wheel of Civiale, which had been retained for half a century, although it excoriates the hand. The adoption of all these changes in the most common American lithotrite, and their recent valuable endorsement, in his later instrument, by so skilful a lithotritist as Sir H. Thompson, show their value.

Before choosing the instruments for an operation, I measure both the urethra and the stone. But the limit to the size of instruments is not merely mechanical. It is also related to the fact that the membranous urethra is peculiarly intolerant of injury.

The healthy urethra, according to Otis, has a calibre of 32 French, the meatus being about 24. I generally use a catheter about 29 French (18 English), but also smaller sizes, which are often more comfortable to the unetherised patient, and, in a diseased subject, safer. With 25 or 26 you can produce the click of a last fragment or a small calculus, and easily deliver it when crushed. In fact, much of the débris of a stone is in the form of dust, and what is not can be further comminuted.

But when the stone is not a small one, and the urethra is of normal capacity, I use the size 29 or 30, or even 31—as large as

the urethra will comfortably admit, not larger. The advantage in doing so is that the smaller fragments need not be crushed again.

Strong lithotrites are now in general use for large and hard stones. I like a large lithotrite on account of its powerful, rapid, and efficient action, but it by no means follows that it is essential to use a large instrument to break a small stone. Any small lithotrite answers for small stones. The average stone of these days is small. I always crush a last fragment with a small instrument. A large stone once broken can obviously be treated by an instrument of less size; but once in the bladder, I think the surgeon will generally continue to use the instrument with which he has successfully begun the crushing.

A calculus out of the bladder would be crushed best by a colossal instrument at a single grasp. It is the necessity of safely introducing and withdrawing the instrument that determines the size of its blades. The length has most to do with their introduction, the calibre at the heel with their withdrawal through the prostatic and membranous urethra.

*Length of the blades.*—While long blades slide easily from the meatus as far as the triangular ligament, the delicacy and skill of a practised operator are needed at this part of the passage. On the other hand, once safely in a bladder of fair size, a long blade has a positive advantage in seizing and crushing the stone. The instrument can be readily turned down either way upon the oval floor, especially if the handle be inclined a little to the side towards which the blades are turned. Behind the perpendicular wall of a high prostate, short and blunted blades, which can be inverted readily, are the most convenient.

The calibre of the blades is a question by itself. Blades may safely be large at the heel, which is the largest part, if they do not become clogged with débris, and, by their increased size, endanger the neck of the bladder while being withdrawn. If they cannot be cleared of débris they should be small. Fergusson's method of removing débris with the lithotrite is not now generally in use. No lithotrite that can be cleared is drawn out loaded. It is almost universally agreed that fragments can be removed better through a catheter than in a lithotrite. This fact has led torenewed search for a lithotrite that can be completely emptied and closed before withdrawal, without danger of impaction. It can then be made stronger and larger—at least as large as a smaller lithotrite when it is full of débris, or of the evacuating catheter (26 to 29 French) that is used at the same time—and as it does not need to be repeatedly withdrawn to be emptied, crushing can be continued as long as it is desirable.

The dust of certain stones mixed with mucus clogs the lithotrite, especially at the heel, with a very hard composition. To prevent this, I have recommended a high floor at this part, or, what is the same thing, low sides, in the female blade; and in the male blade, lateral notches steep enough to push off the débris laterally. This plan has been adopted in the more common American instrument. I also think well of the fenestrated lithotrite in practised hands, An instrument of this kind will comminute the stone, especially a hard one, sufficiently to pass the catheters. When lithotritists, three years ago, were warning each other against the danger of fatal cystitis, which had been attested, as they supposed, by the experience of half a century, my first precaution while making experiments was to protect the floor of the bladder by a solid female blade. A projecting splinter of stone, firmly set in the fenestra of an open female blade, while being crowded through it, is obviously a dangerous weapon. The blades should always be lifted off the floor as soon as the fragment is secured, before crushing it. But it is a great relief to the hand of the operator if the blades shut, at the last moment, quietly altogether. The old fenestrated instrument can be made to crush as well as cut the stone by widening the female blade and sharpening its rim inside so as to retain it. This also protects the bladder from any scissors-like action of the edges. The sole of the male blade is grooved lengthwise, and serrated. In order to widen the hold upon the stone in another way, and occupy less room in the urethra, I have used a zigzag, fenestrated blade which has proved quite efficient. I have employed a fenestrated instrument with great success upon a hard stone, which it crushes and does not so much slice as it does a soft stone. Dr. Keyes first advocated the use of the fenestrated instrument to avoid impaction in the long sitting.

The toe of the female blade should be not only long, and rounded, so that it shall not injure the upper wall of the prostatic urethra as it moves along, but I have also curved it forward. Its added length, besides protecting the bladder, then makes the passage easier.

I may add a word about lithotrites. Mine are of several sizes, and of two sorts—the solid and the fenestrated. The latter, of course, cannot clog, and has been sufficiently described. Of the former it may be further said that it does not clog, the notches in the male blade being steep enough to deliver the detritus at the side. It is absolutely essential that the notches be deep and well slanted. This implies a thick male blade, to which I have no objection. The crushing is chiefly done at the front of the blades, where, so far as I know, every other lithotrite with solid blades clogs. The heel, which never crushes

advantageously, has here a long narrow fenestra, cleared by a projecting metal plate which passes through it. This divides the débris, one-half of which falls off at each side from the high floor, and effectually hinders clogging where it is always worst. These lithotrites have the male blade lock and long vulcanite handle. They measure at the largest part of the heel 26 French. The stem of the instrument is small, and moves freely in the urethra, but it communicates great power to the blades, which are strong, and adapted to general use.

A straight catheter, which I think evacuates best, generally passes with great ease. Sometimes a curved catheter passes better, and now and then the urethra is capricious about receiving any instrument. In passing an instrument, after dividing the meatus if necessary, or divulsing a stricture, we reach at once the triangular ligament, where the chief difficulty of the passage lies. Here the instrument should be insinuated with a light hand, not by depressing the handle in a quarter circle as if it were a catheter, still less by force, but the aperture should be carefully sought for. Beginners are very apt to strike above it. To avoid this mistake, after the instrument has been passed vertically down *quite as far as it will go*, it should be withdrawn a little before being pushed forward, and this manœuvre repeated till the point drops through the ligament. A student may quickly acquire great skill in passing an instrument in the living urethra, by practice upon the dead subject, if he will twist a common tin sound into irregular angles and curves, and pass first one end and then the other through this opening. The ligamentous orifice is really the turning point in the successful passage of an instrument. Once safely beyond it, a catheter, if straight, can be rotated horizontally through the prostatic urethra. But a curved catheter, or a lithotrite, should be lowered only to an angle of about 45° with the horizon, if the patient is on his back, and then urged carefully forward like a boat in the water upon an even keel. The floor of the canal is depressed by the heel of the instrument as it slides along, and this relieves its roof from the pressure of the toe.

I usually search for a stone with a common tin sound bent extemporaneously to suit the case, and measure it with a lithotrite, which also makes an excellent sound. The search for a last fragment or a minute calculus is best done with a small evacuating catheter by which the fragment can escape, or, if too large to pass, is arrested with an audible click. A trap and bulb are attached to it. In these days fragments are made to seek the sound rather than the sound the fragments, as has been the case heretofore. I think that the old method of sounding for a small calculus is generally abandoned, unless the calculous material is adherent or otherwise immovable.

Evacuation is a simple thing, and is usually successful, even with an imperfect evacuator. To secure the water I tie an elastic band around the penis after the catheter is in place, and judge of the distension of the bladder by ascertaining, from time to time, the tension of the urethra behind it. The pumping is an easy continuous movement. There is no need of pausing after the stroke, which may be as rhythmical as the swing of a pendulum. If any pause is made, it is after compressing the bulb, to let the débris settle, when there are few left. Every fragment, sooner or later, finds the catheter, most of them at once, and with surprising readiness. The most advantageous spot, higher at first, lower when fragments become fewer, is soon discovered by trial. A quarter of an inch higher or lower sometimes makes an unexpected difference. When the fragments cease to fall into the receiver, the catheter may be immediately withdrawn. But I often add to the evacuation a thorough sounding in pursuit of a possible last fragment, which perhaps does not exist, and thereby make the operation much longer. This search can be deferred if the condition of the patient makes it desirable, although I do not think it more important to abbreviate this surgical operation than any other. Without this prolonged attempt at complete evacuation, verified by a final careful sounding, evacuation is usually a short matter; and the number of grains evacuated in a unit of time, say in a minute, is large.—*Lancet, Sept.* 24, *Oct.* 1, 1881, *pp.* 533, 577.

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## 48.—A NEW METHOD OF OPERATING FOR PHYMOSIS.

Under the care of Dr. R. J. Levis, Philadelphia.

Reported by H. Augustus Wilson, M.D.

At a recent surgical clinic, held in the Jefferson College Hospital, Dr. Levis showed the class his new procedure in the operation for phymosis.

The accompanying cut [kindly lent by the Editor of the Medical Press and Circular] illustrates the instrument devised for the purpose. It is four inches long, and somewhat resembles the ordinary mathematical dividers or compasses. The legs have blunt terminations, and on their outer surfaces, for a distance of an inch and a half, are deeply serrated, with teeth set backward, to prevent the mucous membrane from slipping when traction is made. By means of the thumb-screw the blades are forced apart and retained in that position throughout the operation.

The method of using the instrument is to insert it closed within the prepuce, passing it well up to the corona of the glans. By turning the thumb-screw the blades are widely

separated, thus making tense the mucous membrane. Traction is then made upon the instrument, and at the same time the outer elastic skin is drawn backward, and divided near its junction with the mucous membrane, by a circular sweep of a knife. After division, the integument is retracted, exposing to view the mucous membrane beneath, which is then freely cut with scissors quite close to its attachment to the glands, leaving only sufficient to hold sutures. To this stump of mucous membrane the cut edge of skin is attached by three or four points of interrupted suture.

A cord or a few turns of a narrow roller bandage may be tightly applied as a tourniquet around the root of the penis, to render the operation bloodless. Any bleeding vessels may be ligated, but usually the hemorrhage is not sufficient to render ligation necessary.

The after treatment is the same as after the more ordinary operations.

The method so frequently adopted of removing an equal amount of mucous membrane and skin, or, as is more apt to be done, because of its elasticity, removing an excessive quantity of the normal outer skin, is open to serious disadvantages, which this procedure will avoid. The prepuce, after such operations, instead of lying normally in folds behind the corona, is, as a not uncommon result, stretched too tensely over the body of the organ, rendering erection sometimes painful, often difficult.

The writer has recently seen a case where, as a result of a faulty operation for phymosis, the penis was without integumentary covering for about one-half of its extent, and the organ, thus deformed, was a source of great annoyance to the patient, preventing him consummating a marriage engagement.

The object of this improved procedure is to remove nearly all of the inelastic mucous membrane, in which structure the constriction generally lies, and to leave as much as possible of the elastic skin to cover and protect the glans penis. The removed and morbidly tight mucous membrane is substituted by the elastic skin, as far as necessary. The ready convertibility of the skin into mucous membrane, and *vice versâ*, is recognised in operations about the nose, mouth, and other parts where the skin and mucous membrane are joined. The instrument may be obtained from the surgical instrument makers.—*Medical Press and Circular*, *July* 27, 1881, *p.* 71.

## 49.—ON THE RADICAL CURE OF HYDROCELE.

By J. C. Ogilvie Will, M.D., F.R.S.E., Surgeon to, and Lecturer on Clinical Surgery at, the Aberdeen Royal Infirmary.

Very many different modes of obtaining a radical cure have been proposed, such as injections of iodine, spirit of wine, port wine, solutions of alum, sulphate of zinc, or corrosive sublimate, chlorine gas, and lime-water, &c.; incision of the sac, or excision of a part of it; silk and metallic setons; tapping and applying pressure by strips of adhesive plaster; scratching the interior of the sac with a sharp needle, or passing a probe coated with nitrate of silver into the cavity after paracentesis, and other plans which do not require notice.

Of all the procedures yet proposed, the injection of iodine holds the first place in the estimation of the profession, and deservedly so, for it is only in exceptional cases that it fails.

In proof of its almost universal acceptance, I may tell you that Mr. Syme related, in one of his inestimable essays, that the treatment of hydrocele was wont to be a favourite subject with students for their graduation theses, but that "since the use of iodine has been introduced the theses on hydrocele have gradually become fewer, until they entirely disappeared; whence I concluded that the advantages of this means were so manifest that they had led to the abandonment of all the others, and left no room for discussion," and although many attempts have been made to supplant injection by other modes, they have been but ephemeral.

An opportunity was recently afforded you of seeing how this little operation should be performed; and although many different plans are in use, such as those of Sir Ranald Martin, Curling, and Van Buren, the mode proposed by Mr. Syme, which I invariably employ, is the simplest and surest one. His directions were as follows:—"In the first place, the patient should stand while the sac is tapped, in order to let the water be drained off completely. Then two drachms of the Edinburgh tincture of iodine, which is much stronger than that of the Pharmacopœia, should be injected, unless the tumour is either very large or very small, when there may be a corresponding increase or diminution of the quantity employed; and, lastly, a rough shake of the scrotum should diffuse the injected fluid over the whole surface of the cavity." To these instructions I would add a single suggestion for your guidance, viz., that after the trocar is withdrawn the canula should be well pushed home, so that there may be no risk of its falling out or receding so far from the vaginal cavity as to permit of the entrance of iodine into the surrounding cellular tissue.

Injection of iodine occasions considerable pain at the time,—

indeed, so acute was it in one of my cases that the patient fainted,—but it speedily disappears. About twenty-four hours afterwards you may look for the recurrence of pain, and you will find some effusion and swelling of the testicle, which generally subside in the course of a few days. The orchitis does, however, vary greatly in degree in different cases; for I have myself seen one where it was scarce perceptible, yet in it the cure was perfect, but I have also had patients under my care where there was great orchitis and extreme pain. In the case of the man with hernia and opaque hydrocele there was positively no tenderness nor enlargement of the testicle or its appendages after injection; in short, the case simply pursued such a course as follows simple paracentesis, viz., slow re-effusion of fluid.

When considerable inflammatory reaction ensues I have found much relief to accrue from the application of a tobacco poultice made by boiling an ounce of cut tobacco with a sufficiency of water to make a cataplasm, and then adding linseed until a proper consistency is reached. No other treatment is required, but before the patient resumes his ordinary avocations he should provide himself with a suspensory bandage, which he should continue to wear for some weeks.

The pathological changes produced by the injection of iodine, by which the upset balance between secretion and absorption is restored, are not always alike, for post-mortem examination has shown that in some there was complete obliteration of the vaginal cavity, in others partial adhesions, and in a third class no adhesions were discoverable. Billroth has suggested that the arrest of the hypersecretion is due to shrinkage of the serous membrane with new formation of endothelium, that there is condensation and probably increased formation of the connective tissue, which, contracting on the serous membrane, causes it to shrink to its normal size, and in this wise we are enabled to account for a radical cure without the presence of that condition of parts which was for long deemed essential, viz., complete agglutination of the two surfaces of the tunica vaginalis.

In a recent case I applied iodine to the interior of the hydrocelic sac in this way. Instead of drawing off the fluid by a trocar, I passed a sharp-pointed probe threaded with silk through the lower part of the swelling, and brought it out above, and allowed the serous fluid to drain away by the side of the ligature. After all the water had escaped, I moistened about an inch of the thread with iodine liniment, and by making traction on its other end the iodized portion was brought within the cavity of the sac. A little gentle friction was next used for the purpose of spreading the iodine over the

secreting surfaces of the hydrocele, which, by the way, was a small one. The same process was repeated by the patient at intervals of an hour, and when, after the eighth application of iodine, sharp pain was felt, the thread was altogether withdrawn. Slight swelling and effusion followed, but a radical cure resulted. Mr. Furneaux Jordan, when submitting this mode to the profession, wrote strongly in its favour, and he considered it specially applicable to encysted hydroceles of the cord and testis, as "the walls of the cysts are usually thin, and collapse so much when their contents are withdrawn that the injection of iodine is uncertain. The end of the canula may be outside the cyst, and the iodine solution be consequently injected into the connective tissue at its exterior." With the seton this cannot happen, and in such cases as those you will find it a reliable and efficient measure.

With the exception of tapping and strapping, which has recently been revived, but which seems to me to have little to recommend it, all the other methods of curing hydrocele have fallen into deserved disuse; and as I am unable to offer you any clinical examples of their effects, I need not detain you with any notice of how they may be carried out. In addition to the cases now reviewed at length, examples of other forms of hydrocele have been recently under treatment in my wards, such as double vaginal hydrocele; acute vaginal hydrocele accompanying epididymitis; chronic effusion into the cavity of the tunica vaginalis in a case of gummatous deposition in the testicle; encysted hydrocele springing from the epididymis; congenital hydrocele; and an example of a very rare form, where there was effusion between the tunica vaginalis and tunica albuginea. Opportunities have thus been afforded of examining most of the known varieties of hydrocele, a circumstance which proves that within a limited area this disease may be encountered in varying and many-sided forms, and that a correct knowledge of this subject is therefore indispensable to all who propose entering on surgical practice, and who desire to conduct it successfully.—*Edin. Med. Jour.*, *July* 1881, *p.* 22.

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## 50.—ON THE CATHETER-TREATMENT OF PERINEAL FISTULÆ.

By J. C. Ogilvie Will, M.D., F.R.S.E., Aberdeen.

I desire to direct your attention to the following case admitted some time since on account of urinary troubles. When he was admitted to hospital he told us that some months previously he had fallen from the top of an omnibus, alighting on his buttocks; that a severe injury was inflicted on his perineum, that there was at the time a free discharge of blood from his

urethra, that he micturated with great difficulty, that inflammation supervened, and that the surgeon under whose care he was opened an abscess which formed in his perineum, after which urine continually flowed from the wounds. Attempts to pass instruments into his bladder had been made, but they were unsuccessful. On examination, two large fistulous openings, one on the right and the other on the left side of the perineum, were found; and upon urethral exploration, an obstacle, which I had but little difficulty in recognising as a traumatic stricture, was found in the bulbous portion of the canal. When he micturated very little urine came by the meatus, most of it flowing from the fistulæ. The stricture was, as traumatic strictures often are, exceedingly difficult to penetrate, but with the aid of a very small elbowed French catheter I succeeded in reaching the bladder. The impression I formed was that, as a result of the injury inflicted on the urethra, there had been irregular adhesion of its lacerated edges, and that this and the subsequent cicatricial contraction had led to an alteration of the normal axis of the canal, so that it had assumed an angular form at its strictured part. This conclusion was arrived at from the impossibility of passing any straight instrument, stiff or flexible, or any metallic bougie with the ordinary curve; while an instrument with an angular or *coudée* end readily found its way into the opening of the stricture, and thence into the bladder; and I was strengthened in this belief by subsequent experience, for a like difficulty with the one instrument and a similar ease with the other was experienced until the stricture was dilated to a not inconsiderable extent. I may remark, by the way, that, had I confined myself to the use of the ordinary French flexible or English gum or metallic catheters, this case would in all probability have furnished an additional instance of impassable stricture, but the simple expedient of using an instrument suited to the exigencies of the case fortunately prevented any addition to that list in which no surgeon desires to figure.

Having now laid before you the condition in which our patient was found, let me next direct your attention to the means adopted for the dilatation of his stricture, and especially for the cure of the fistulæ.

Our first desire was—as it should be in every case where urethral fistulæ co-exist with stricture—to restore the canal to its normal calibre, and this we accomplished by a combination of the continuous and gradual dilatation methods, and you will often find that complete dilatation of the stricture is all that is required; for the urine, finding the barrier to its egress removed, flows through the natural channel, and ceases to pass into the fistulæ, which being relieved from the irritation arising from

contact with such putrescent fluid, take on healthy action, and cicatrisation ensues. In this case, however, as often happens where there is loss of substance—*i.e.*, where the openings are large, dilatation failed to effect a cure of the fistulæ, and I had now to consider how the access of urine to the fistulous openings might be most surely prevented.

Two methods of accomplishing this desideratum presented themselves—namely (1), tying in a catheter; and (2), the systematic use of a catheter at each act of urination.

As some of you know, I intended to adopt the former course, but the patient has himself so intelligently carried out the latter that a cure has resulted. If you will examine his perineum and scrotum—where a fistula had also formed—you will perceive that cicatrices mark the points where a few weeks ago there were masses of granulations, and the man tells us that "water now never comes the wrong way"; if he will maintain the position in which he is now placed, by the occasional passage of a bougie, his stricture troubles and their most distressing accompaniments are at an end.

The result is certainly most satisfactory, and has been obtained, I may tell you, much more easily than I could have ventured to hope. The treatment of fistulæ by tying in a catheter, of which I would now speak, has fallen into undeserved disuse, but in cases where you cannot rely upon the patient's intelligence in carrying out the method just mentioned, or where the urethra rebels against the frequent passage of a catheter, you will, I feel assured, find it most useful. I should, however, not conceal from you the fact that this mode has been "weighed in the balance and found wanting" by those who are justly entitled to speak with authority. Sir Henry Thompson has stated that on account of the capillary action which is set up between the sides of the instrument and the urethral walls urine flows out, and finds its way through the fistulæ. "This mode of treatment," he writes, "is to be regarded as inadequate to the cure of fistulæ, except so far as it produces dilatation; and it is one which has obtained countenance chiefly from the plausibility of a theory which is certainly unsupported in practice." Mr. Reginald Harrison, who has recently written on this subject, holds a similar opinion—viz., "I have never found any advantage from the retention of a catheter in the bladder with the object of curing a fistula, as the urine invariably makes its way into the fistula by the side of the instrument." To the adverse testimony of these two surgeons I could easily add similar opinions culled from the works of many other well-known and distinguished writers, but as I seek not to secure your condemnation of, but your favour for, this method, it would be unwise to so prejudice you as to prevent your acceptance of it.

For the purpose of proving that the opinions just quoted are not absolutely correct, and that the mode of treatment under notice is not deserving of the obloquy cast upon it, let me recall to your recollection two cases recently in this hospital. As the first one presents features of considerable interest apart from the result of treatment, I shall recite it at length. One evening I was sent for in haste to J. K——, who had been admitted after the hour of visit, suffering from retention of urine. The man was then suffering so acutely from the effects of retention that he was unable to supply me with the particulars of his case, but I subsequently learnt that he had been under treatment in hospital for stricture, and that he had been dismissed six weeks previously, a full-sized bougie having been passed. He had remained fairly well until a few days before his readmission, when he began to find difficulty in urination; thirty-six hours before he came under my notice he was attacked by complete retention, and he was seen by a medical man, who at that time and subsequently made attempts to pass a catheter but failed, and he was then sent here. On inspection a huge hypogastric swelling presented itself; there was great œdema of the scrotum and penis, and bulging of the perineum on the right side. On account of the perineal swelling no rectal examination could be carried out. Attempts to pass a catheter were unsuccessful, and the administration of chloroform, which was commenced, had to be stopped, as dangerous symptoms supervened. I at once determined to aspirate his bladder, and drew off two and a half quart bottlefuls of highly ammoniacal urine. The perineal abscess was freely opened and a considerable quantity of pus was discharged; it was odourless.

On visiting the patient next morning I found the house-surgeon in the act of applying the exhauster of the aspirator to the needle, which had been allowed to remain *in situ*, but no urine entered the receptacle. There was therefore no water in the bladder, a circumstance of which an explanation was speedily forthcoming, for the bed on which the man was lying was soaked with urine, which had found egress through the perineal opening. The œdema of the parts had become much lessened. Catheterism was still impossible, but two days later a bougie-conduct rice was safely conducted into the bladder, and through a catheter, which was screwed on to the end of the conducting bougie and passed into the viscus, several ounces of urine flowed.

Before speaking of the treatment adopted for the cure of the fistula which thus resulted, let me give you in a few words my view of the pathology of this case. When I first saw the patient

certain of the symptoms suggested rupture of the urethra and extravasation, for there was a history of prolonged retention, and an œdematous scrotum and penis. But the presence of an over-distended bladder disproved that idea, for I need hardly tell you that had rupture taken place the urine would speedily have found its way outwards, and would have spread into the perineum and scrotum, and upwards through the cellular tissue covering the abdomen. Further, the pus evacuated from the perineal abscess would have had a urinous smell, but it was odourless. The abscess was, in short, not the result of extravasation, but it was the cause of the retention, and the subsequent escape of urine through the perineal opening resulted from necrosis of the urethra occasioned by inflammatory action. If assistance had been but a little longer delayed urine would undoubtedly have been found mixed with the pus, and had relief been afforded at an earlier period rupture would have been averted. I have digressed from our subject, but the lesson which this case teaches is a vital one, and if it impresses you with the necessity for early interference in cases of perineal abscess the time devoted to its consideration has been usefully spent, for there will be no risk of your allowing a similar case to be followed by such undesirable consequences as ensued in this one.

Our patient's progress, though it was slow and protracted, can be laid before you in a very few words. When the urethra had resumed its normal dimensions, a full-sized English gum catheter was lodged, and the fistulous opening, which was a large one, gradually decreased in size, the discharge of pus and urine from it became less and less, and ultimately a cure was effected. Before that most desirable result was attained there were many vicissitudes, for during a period of several days we found that all the water came through the catheter, and then when it seemed that a cure was nigh, we were told that some drops of urine had found their way through the fistula. This latter circumstance was observed only when the catheter had lain in the urethra for some days, and its explanation was found in the fact that the eye of the catheter had become encrusted with the phosphates, and that the means employed were therefore imperfect. Acting upon this suggestive hint the dresser, Mr. John Reid, used a fresh instrument every three or four days, a procedure which perfectly overcame the difficulty, and from this time progress was uninterrupted. The oversight of the necessity of using a new catheter at short intervals furnishes us with one, at any rate possible, reason for the failure of this method of treatment in the hands of those who have employed it and condemned it; and if you should be called upon to adopt it, you should bear in mind our experience here. In tying

in a catheter you will find the following plan a good one. Procure a flat, narrow india-rubber band, such as is sold by stationers, pass it over the glans into the groove behind the corona, and attach it to the catheter by two or more threads of well-waxed suture silk. This is a cleanly and efficient mode, and seems to me to be superior to plasters or tapes, which are generally recommended. The second case to which I have alluded as an example of the utility of bladder-drainage was one of long-standing multiple perineal and scrotal fistulæ, where many repeated and varied attempts at effecting their closure had proved futile. In this case extreme induration of the tissues was a most marked feature. Treatment by means of a catheter tied in was ultimately adopted, and in the course of a few weeks the abnormal openings were soundly healed, and the induration had completely disappeared.

These two cases show you that perineal fistulæ can be cured by this simple and easily carried out precedure ; but a modification of this method, which I regard as a decided improvement, although I have not yet had an opportunity of putting it to the test of practice, has recently been proposed by Mr. Chiene of Edinburgh. His method of bladder-drainage consists in the establishment of a syphon, which he accomplishes by means of a piece of india-rubber tubing attached to a gum-elastic catheter, which is introduced so that its eye is just within the neck of the bladder, and it is kept in position by sticking-plaster. The tubing passes over the side of the bed into a bottle placed on the floor, and by filling the tube and the bottle with carbolic water a syphon action is set up. This is only a rough and imperfect sketch of the mode devised by Mr. Chiene; but you will find full details in his most suggestive paper contained in the Edinburgh Medical Journal for December, to which I refer you. Now, if this syphon action can be maintained we may regard the india-rubber tube as an elongation or prolongation of the ureters, for a direct and continous connection is established between the kidneys and the recipient vessel, and the bladder ceases for a time to exercise its normal function as a receptacle for the urinary secretion. Mr. Chiene has shown that this is possible ; hence we must view this new mode as a decided advance on the old one, and with its introduction the objection to the catheter-treatment must disappear; and I believe that bladder-drainage will ere long become an established practice among those who are called upon to treat cases of urinary fistulæ.—*Lancet*, *June* 11, 1881, *p.* 941.

## AFFECTIONS OF THE EYE AND EAR.

### 51.—ON THE ADVANTAGES OF OPENING THE CAPSULE BEFORE MAKING THE CORNEAL SECTION IN THE OPERATION FOR CATARACT.

By W. Spencer Watson, F.R.C.S., London.

At the moment of lacerating the capsule in the operation for senile cataract there is a danger of displacing the lens backwards into the vitreous—an accident leading to almost inevitable disaster. If, however, we consider the delicacy of the suspensory ligament of the lens, and the circumstances under which the capsule is lacerated, the disruption of the former and the consequent displacement of the lens is hardly to be wondered at. In the old operation, the corneal section having been made, the aqueous has, of course, escaped, and the pupil has become contracted before the cystitome is introduced. The point of the instrument has consequently to be passed into a small pupillary aperture, and then out of sight behind the iris, the capsule being lacerated in the dark and by the aid of tactile sensibility to a great extent. If an iridectomy has been already performed, the case is somewhat improved, but even then the iris is much less controllable after the loss of the aqueous than in an interior chamber in which it lies as a suspended diaphragm. If too the iridectomy has been performed at the time of the extraction, the pupil is obscured by the effused blood, and the point of the cystitome is even more hidden than without an iridectomy. In either case the point is very liable to be thrust too deeply into the cataract, and in the lateral movements following the lens is displaced. Or, on the other hand, the capsule may be opened to too limited an extent, and the subsequent stages of the operation are correspondingly embarrassed.

In the operation first proposed by Dr. Correnti, of Florence, and which I have performed in numerous cases, the cystitome (a curved cataract needle) is passed into the anterior chamber through the cornea before the section of the latter is made. At this stage the pupil, if previously dilated by atropine or any other mydriatic, remains widely open during the movements of the cystitome within its area, and a free laceration of the capsule can easily be effected, the point remaining visible to the operator all the time. There is this incidental advantage—the iris is less likely to be scratched or pricked by the needle than with a contracted pupil; and as it is floating in aqueous there is a certain space between it and the lens-capsule into which the point of the cystitome may pass, if necessary, without coming into contact with the iris.

In performing this step of the operation it is important that the needle should pass obliquely through the corneal layers, and that its withdrawal should be slow, otherwise the aqueous escapes as the needle is withdrawn, and the subsequent steps of the operation are embarrassed. I have generally succeeded in avoiding the escape of the aqueous, and have had no difficulty in making the corneal section in the usual way afterwards; but when a portion of the aqueous has escaped, a little additional caution in passing the cataract-knife across the anterior chamber enables one to avoid its point getting entangled in the iris. If, however, this happens, it is a matter of very minor importance, as compared with the displacement of the lens into the vitreous—the not unfrequent consequence of the use of the cystitome in the ordinary methods of operating. The needle I employ in this operation is more curved than that ordinarily used, and in order to allow of its point coming easily and directly into the pupillary area, I thrust it obliquely into the cornea from the temporal side at a point about half a line within its margin, and with the concavity of the needle towards the surface of the cornea. If I am in doubt as to the thickness of the cortical portion of the cataract, I at first make only a puncture in the centre of the capsule—the deeper it goes before meeting with resistance from the hard nucleus, the thicker is the cortex. In this way, and by the visible effects of the subsequent free laceration of the capsule, I can form a very fair estimate of the size of the nucleus, and its bulk relatively to that of the cortex—data very important as guides to the surgeon in regard to the extent of the corneal section. For instance, if I find that there is an abundant soft cortex with a small nucleus, I content myself with making a small corneal section, equal in extent to, perhaps, one-fifth or one-third of the circumference. If, on the other hand, the nucleus is unusually bulky, I make a correspondingly large section of the cornea, and perhaps remove a piece of iris as well. To sum up the advantages of this method—

1. The dilated pupil allows of the free and visible movements of the cystitome.

2. The margin of the pupil is less liable to injury than in the old method.

3. The relative bulks of the nucleus and cortex can be ascertained before making the corneal section, and the subsequent steps of the operation can be modified in accordance with the varying conditions thus ascertained.

4. The operation is rendered easier and safer.—*Medical Times and Gazette, May* 7, 1881, *p.* 515.

## 52.—ON AN IMPROVED OPERATION FOR A NEW PUPIL AFTER CATARACT OPERATION.

The opening of the pupillary space which has become closed through inflammatory processes following an operation for cataract involves frequently a considerable amount of danger when performed in the usual way by means of Wecker's scissors. Not only, owing to the necessarily large size of the opening in the cornea, is there apt to be a considerable escape of vitreous, but the opening formed in the iris is extremely liable to close again after some time. The author believes that less risk is run, and at the same time a better result obtained, by operating in the following manner:—A large free transverse section of the iris and all underlying membranes is made by means of a knife sufficiently narrow to enable it to be turned on itself in the wound, at right angles, when necessary, to the position given it in making the puncture of the cornea. The knife is entered at the sclero-corneal junction, at the outer circumference if the cut is to be horizontal, and at the lower if it is intended to make it vertical. "It is then carried completely across the anterior chamber, precisely as if a counter-puncture were to be made, until the point arrives at the peripheral portion of the major arch of the iris. The section is then performed by suddenly depressing the point of the knife with a bold free movement of the hand, until the handle of the knife, from being horizontal, assumes a vertical position. Nor should the operator be content with this movement alone, but supplement it, while the point of the knife is still deep in the vitreous, with a gentle swing movement while the knife is being withdrawn." The success of this operation depends on the thorough division of all the fibres of the iris. If an attempt be made to depress the knife on the flat, a portion of the iris is apt to be torn from its attachments, the rest being only folded back, so that it is liable to return to its position as soon as the knife is withdrawn. "The turning of the knife wrinkles up the cornea to a certain degree, but, notwithstanding this, the rotation should be thoroughly performed." Generally, the hemorrhage following this operation is sufficient to fill the pupillary space, so that an immediate improvement in vision is not to be expected, but we are told that "sooner or later a marked improvement almost invariably takes place, provided the sensation of splitting of the tissues under the knife is followed by the appearance of a black pupillary space." When the occluding membrane is exceptionally dense, a second instrument may be used to support the iris, so as to prevent its being torn away from its attachments. An ordinary stop-needle passed vertically through the periphery of the cornea and transfixing the iris is all that is absolutely necessary; but to prevent the iris gliding down the needle,

Loring makes use of a small curved stop-needle. The advantages claimed for this method of operating are, the little violence done to the eye, the absence of any escape of vitreous, the rapid closing of the wound, its harmlessness and rapidity (Loring, in *Transactions of American Ophthalmological Society*).—*Edinburgh Medical Journal, June* 1881, *p.* 1136.

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## 53.—ON THE TREATMENT OF CHRONIC SUPPURATION OF THE MIDDLE EAR.

By Robert Sinclair, M.D., Physician to the Dundee Royal Infirmary, and Physician to the Aural Department.

A patient suffering from chronic suppuration of the middle ear as a rule requires attention to the following conditions :—Catarrh of the naso-pharyngeal space and of the Eustachian tube, with partial or complete closure of the latter; suppurative inflammation of the mucous lining of the tympanum, and in some caries of its bony structures ; perforation of the membrana tympani ; defective hearing power, and impairment of general health.

1. The naso-pharyngeal space is usually the starting-point of the malady, and may have recovered by the time the patient comes under treatment ; but in a very large proportion of cases it will be found in a state of chronic catarrh. If so, it is necessary to bring it into a healthy condition by cleansing and tonic applications. To begin with, the excessive use of alcohol and tobacco must be interdicted. A gargle composed of a saturated solution of chlorate of potash ; or of common salt, one drachm to half a pint of water, should be used twice daily. Should the mucous membrane of the nasal passages be much or chiefly affected, I know of no better means of initiating healthy action than by the use of weak and warm alkaline lotions thrown down the nares by the post-nasal syringe, which I have used regularly ever since my attention was drawn to it in an excellent paper read by Mr. Lennox Browne before the British Medical Association at Sheffield in 1876. I can quite corroborate every word of Mr. Browne in praise of this instrument. Time after time I have with its aid removed large masses of inspissated secretion which nothing else could have reached so safely, and I have never found any complaint of pain from its use even in very young children. When the products of inflammation have been thoroughly cleared away, inhalations of steam medicated with carbolic acid, creasote, pine oil, or tincture of benzoin should be used daily, and forced into the Eustachian tubes by the Valsalvan method. This plan of treatment not only serves to bring the naso-pharynx into a healthy condition, but helps materially to keep the Eusta-

chian tube open—an end that is still further attained by the weekly or bi-weekly use of Politzer's inflator.

2. *The Suppurating Surface.*—Up till a very recent time it was the usual practice to treat chronic tympanic suppurations by means of warm astringent solutions of varying strength and composition, which in many cases yielded admirable results But their use was attended with some disadvantages, among which may be mentioned the difficulty of ensuring thorough application, especially among dispensary patients; the pain and irritation induced; and the risk of fresh inflammation in patients exposed to great changes of temperature.

Considering the wonderful revolution which has been effected in surgery by the antiseptic method of Professor Lister, it is not astonishing that attempts should have been made to secure some of its advantages for the treatment of this obstinate malady; although it must be obvious to any one acquainted with the teaching of the great founder of antiseptic surgery that its strict adoption is impossible here. What may be termed a *limited* antisepticism is, however, not only possible, but has been proved by ample experience to be a very important step in advance of the astringent method. A necessary preliminary to antiseptic as to any other treatment of a suppurating tympanum is, in my opinion, thorough cleansing with a warm alkaline solution. The patient holds his head over a basin, and the stream is forced through a brass syringe (fitted with a conical nozzle to prevent reflux) along the external meatus, through the middle ear, Eustachian tube, and nasal passages. By this means the entire tract is cleared of pus and mucus. Inflation with Politzer's bag is then practised to drive the water remaining in the tympanum into the external meatus. Finally, the parts within reach are carefully mopped with a piece of absorbent wadding fixed on a bent aural probe or rectangular forceps, and the antiseptic treatment may be commenced.

As it is one of the unquestionable advantages of the new method that dryness of the parts is aimed at and obtained to a very large extent, all routine syringing must be avoided. I am well aware that many excellent authorities exclaim against washing of the suppurating ear at all, and adduce as their reason the irritation produced on the delicate structures by moist applications. Still I can see no objection, and have seen much benefit, from a thorough preliminary cleansing with water, and its repetition when pus has accumulated in inconvenient quantity. Such procedures, indeed, appear to me to be justified equally on theoretical and practical grounds.

When the parts are thoroughly cleaned, either in the manner already indicated or by mopping up the discharge by means of

absorbent wadding, the drug selected should be blown into the meatus and tympanum with the aid of an ordinary powder-blower. As often as necessary this should be repeated. The dry antiseptics mostly in use are salicylic acid, boracic acid, and iodoform.

*Salicylic acid* has been highly recommended by, among others, Dr. Cutler, in the Maryland Medical Journal, July 1879, and by Dr. Chisholm of Baltimore. My experience of it has not been extensive; but, so far as it has gone, it has not been favourable. It has frequently caked in a very troublesome way, and, on the whole, produced so little beneficial effect that I was not long in abandoning it in favour of

*Boracic acid* in the form of impalpable powder, This remedy has been very strongly urged on the notice of the profession by Drs. Bezold, Becker, and Cassells. I have used it very largely for some time past in two ways—blowing it in by the powder-blower, and packing the meatus thoroughly in the manner recommended by Dr. Cassells. In the slighter cases I have frequently obtained good results; but in the more severe the treatment has been very prolonged and tedious. The caking, which was a drawback to the use of salicylic acid, was scarcely if at all less troublesome with the most finely pulverized boracic acid. This disadvantage has also been commented on by Dr. Pierce of Manchester. I have by no means abandoned boracic acid, but my first hopes from it have not been realized.

*Iodoform* was recommended first, I think, by Dr. de Rossett, and has been lately extolled by Czarda. It is applied in the same way as salicylic and boracic acid. Scarcely anything in my experience of aural therapeutics has given me so much satisfaction as this remedy. The rapidity with which both fœtor and pus in very old-standing cases disappear under its use is truly astonishing. In the most inveterate cases I have seldom found it necessary to make the application oftener than twice a week. While I do not claim for it infallibility, or anything approaching such a position, I believe iodoform, properly applied, will lighten the labour and anxiety of those who undertake the treatment of tympanic suppurations more than anything else which has hitherto been advocated. Its objectionable odour may be very largely mitigated by trituration with a fourth part of tannic acid.

3. Defective hearing power is to be treated in the usual way by Politzer's inflator and the Eustachian catheter.

4. The necessary measures for the restoration of general health are too well known to require any enumeration.—*Edinburgh Medical Journal, June* 1881, *p.* 1067.

## AFFECTIONS OF THE SKIN, ETC.

### 54.—OBSERVATIONS ON SKIN-GRAFTING.

By Charles W. McCarthy, L.R.C.S.I., L.K.Q.C.P.I., Clonmel.

Since its introduction in 1869 by Reverdin, of Paris, skin-grafting has been recognised by the profession at large as one of the most valuable additions of late years to our surgical art. This useful process is now in pretty general adoption in our hospitals, and, to some extent, in private practice, in the treatment of large granulating sores where completion of cicatrisation is retarded or impossible, owing to a too great area of granulating surface, and limited power of cicatrisation in the cuticular margin of the sore. I believe there is no operation which can be more successfully accomplished by minute attention to details; there certainly is none in which a little extra care and nicety in its performance will yield more satisfactory results,—a fact which, in my own practice, I have had ample opportunity of verifying.

Transplantation of skin is applicable to a variety of cases. Speaking generally, it is of value—

1. As the only means at our disposal of establishing cicatrisation in sores previously incurable owing to a too large area of granulating surface, or extreme skin tension, as over bony parts.

2. As a certain means of facilitating the completion of cicatrisation in any healthy granulating surface.

3. As a means of limiting undue contraction of cicatrices, and thus, in a special manner, contributing to obviate the unsightly deformities that too often result from severe burns and scalds.

In large healthy ulcers it is invaluable to hasten cure; so also in the extensive sores that remain when the sloughs in anthrax have come away. In the latter cases I have had the very best results from it. I shall select from my notes two instances where I have been especially successful.

Mr. C., æt. 50, suffered in September 1874 from a very large anthrax—the largest I have ever seen—engaging the occiput and nape of neck. When the sloughs separated an immense chasm was left, extending from ear to ear, presenting a frightful appearance. In the course of his illness the usual stimulating, tonic, and nutritive treatment was adopted. When the sloughs were removed I applied on lint, three times a day, carbolic oil (acid. carbolic. ℥js.; ol. olivæ ad. ℥viij). Under this local and constitutional treatment rich healthy granulations sprang up. Owing to the great extent of the sore, I deemed it

advisable to introduce skin-grafts, with the twofold object of hastening cicatrisation, and preventing subsequent disagreeable contraction of parts. The granulations were soon in a suitable condition for the reception of the grafts, *thirty-two* of which, at one operation, I carefully placed in position, the patient having freely allowed me to remove from the forearm seven or eight small pieces, which, by sub-division, made this number. Only trifling pain was experienced. On exposing the sore three days afterwards, I had the satisfaction of finding that *twenty-seven* had taken. It was most interesting to watch the stages of growth in these "centres of cutification." In a very few days islands and peninsulas of cuticle filled in the sore, and cicatrisation was completed with magic rapidity, leaving perfect freedom of movement in the head and neck.

In a case of large anthrax occurring beside the spinal column —dorsal region—in an old gentleman, Mr. L., in April 1878, I had equally good results, *twenty-five out of thirty* having grown at one operation, and the sore healing in a marvellously short space of time.

So large a number of grafts having been planted at one operation, the result in both these cases must be considered satisfactory, and was, no doubt, due as much to special care in placing and maintaining them in position, as to the suitable soil on which they were placed,

I believe the most favourable condition in granulations for the reception of skin-grafts, is that in which they are ruddy, full, and ripe looking. To secure this, carbolic acid, in suitable combination, is invaluable, especially in anthrax, or, indeed, in most sores of the indolent class. As an antiseptic and stimulant it acts beneficially on the sore, and on the grafts themselves. In cases requiring much local stimulation, I have prescribed the following ointment with great advantage:—℞. Vaseline, ung. resinæ, aa ℥j.; acid. carbolic., ℈j.—3 gr. Ft. ung. When clarified, by submerging in another vessel containing hot water, it makes a very elegant preparation.

Given a case where skin grafting is desirable, the first and most essential condition to ensure success is a healthy state of the granulations. I have attempted the process in one or two instances where the granulations were not quite healthy, but cannot say I have been rewarded with even partial success. One was the case of an old lady with an irritable ulcer on the leg. Other methods of cure were previously tried without avail, so I determined to put on a few skin-grafts. I placed half-a-dozen in position, but was not satisfied that any of them grew. The ulcer, however, cicatrised soon after. Whether one or more of the grafts, unknown to me, may have carried on an abortive growth at the margin of the sore, and thus exerted a favourable

influence, through contact or impression, producing healthy action and exciting cicatrisation in the marginal cuticle, I am not prepared to say. I am persuaded by experience there is little use, if any, in transplanting skin on granulations not perfectly healthy. Suitable treatment, constitutional and local, to secure this important condition, will suggest itself in individual cases. Bearing in mind that *excessive* action in the process of repair is injurious, I believe the best results in skin-grafting—all other things being favourable—are to be achieved in the maximum of local stimulation, at a point, in fact, when any further stimulation would be excessive. I find ruddy, ripe granulations on an even surface, discharging healthy pus—the most favourable conditions.

To procure grafts I generally select the anterior aspect of the forearm, where I find there is least pain, and usually proceed according to the directions given, so concisely, by Mr. Bryant, of Guy's Hospital, in his admirable work on surgery. Instead, however, of using the instrument he recommends, I catch directly and nip off, with an ordinary curved scissors, a small oblong piece of skin, about a quarter of an inch long, taking care not to cut too deeply into the cutis versa, a very thin layer of which will suffice. If done dexterously, including only the cuticle with the *rete mucosum* and the mere apices of the papillæ, the pain is very trifling. There is no bleeding, and the patch heals without any treatment. On my thumb-nail, as recommended by Mr. Bryant, I divide this piece into about four parts, taking care not to bruise or otherwise injure the grafts. They usually curl up, and I catch each gently, by its outer surface, on the point of a tenaculum needle, to which it adheres almost without pressure, as if by attraction. The sore having been washed previously with carbolised water, I lay the raw side of the graft on a good ruddy granulation, to the convex surface of which it will immediately adhere, if *lightly* taken on the tenaculum. The curled graft at first does not lie evenly, but by a little gentle continuous pressure with the curve of the tenaculum, it quickly absorbs moisture from the granulation, loses its shrivelled appearance, unfolds itself, appears to get larger and fuller, and in a few seconds lies evenly on its new bed. Bleeding the granulations, as formerly practised, is not necessary. Indeed, I believe it rather tends to mar the success of the operation. The other grafts should be placed with similar care, one inch apart, according to Mr. Bryant. I generally, however, place them half an inch apart, and about the same distance from the margin of the sore, covering with successive rows of grafts the entire surface, unless it be exceptionally large, in which case I leave the centre free, as the grafts here will not take so readily. I believe it to be an advantage to place a

sufficiently large number at one operation. It generally obviates the necessity for a repetition; and, if such can be avoided, it is better not to subject the patient a second time to even the trifling pain experienced. With due care it is quite as easy to get a large number to take as a few, especially if the grafts be placed in wide sores chiefly around the margin. The more numerous these "centres of cutification," the greater will be their effect in exciting citatrisation at the margin (a power which any ordinary observer must admit they undoubtedly possess), and the more quickly will they unite and cover in the sore by proliferation of their own cells. The grafts having been placed, it is of the utmost importance to keep them undisturbed *in situ*. I follow, with some modification, Mr. Bryant's plan, covering the sore carefully with a piece of fine gutta-percha tissue, previously rubbed with carbolic oil, placing over this a small pad of French wool to secure equal pressure, the whole being lightly strapped with adhesive plaster, and bandaged. On the third day I expose and wash the surface very carefully with tepid, carbolised water. Other methods, such as keeping the grafts *in situ* by means of threads strained across them, are not, perhaps, quite as practicable. Some surgeons object to the use of gutta-percha tissue, owing to its non-absorbent nature. It has done sufficiently well in my hands. Those who object to it might try very thin gauze, or, better still, some fine, white gossamer, lubricated with a weak solution of carbolic acid in oil, with or without glycerine, placing over it a light pad of that useful material known as "absorbent" cotton wool, and carefully, but not too lightly, strapping and bandaging.

Generally speaking, if the granulating surface be in a fit state to receive the skin grafts, if due attention be given to neatness and delicacy of manipulation, and the grafts be not subsequently disturbed from their position, there is no reason why each and every one of them should not grow. Failure is only to be ascribed to clumsiness or some neglect in the particulars mentioned.

A question naturally suggests itself. Why should not a large piece of skin be planted instead of several smaller pieces? The reasons are:—Firstly, it will not take with equal certainty because (*a*) it is difficult to remove a large piece without including in it too much of the cutis vera: this would be likely to militate against its growth. (*b*) It is difficult to keep its entire surface on intimate apposition with the granulations; those parts not in apposition are prone to decay, and this decay is likely to spread to the entire graft. Secondly, even if it should take, no advantage would seem to be gained, for it remains, mushroom-like, on the cicatrix, in marked contrast to the tissues around, and growth from its edges is very limited.

Mr. Bryant questions whether newly-engrafted skin is not more liable than the old skin to undergo disintegrating changes. No doubt, for a limited period, it needs protection on exposed parts. Time, however, would seem to produce a hardening effect on the grafts and on the cicatricial tissue formed by them. This is fairly illustrated in the case of Mr. C. (above detailed), whom I specially visited yesterday (Dec. 14, 1880), *six years and six months* having elapsed since the pieces were engrafted in his neck. I found a slightly raised, movable cicatrix, flat, even, and healthy-looking, half-an-inch wide and six inches long, on which the site of most of the grafts was plainly visible, *twenty-two of which I counted.* The remaining five were not discernible. The grafts were mostly embedded in small depressions, but one or two appeared on a level with the surface, with a circular furrow around. None were above the surface. The cicatrix bore rough handling, which the patient himself exemplified. The individual grafts on being pricked with a needle proved to be highly sensitive. I questioned him as to any unusual tenderness in the cicatrix. He answered: "No, I have no tenderness whatever in it. I can use the comb as roughly here as on the crown of my head. Certainly, for a year after it occurred I had a sensitive feel in it, but nothing will affect it now." If anything were calculated to break down this engrafted tissue, the constant irritative effect of the comb would have done so.

The cicatricial tissue produced by grafts is apparently identical with that formed by the margin of the sore. The *rete mucosum*, or pigment layer, is evidently contained in it, as shown by the transplantation of grafts from a negro to a white man, the coloured area increasing largely around each graft—a fact which also proves growth from their edges by proliferation of their own cells. This growth, however, is at best but an imperfect copy of the grafts, which, even after so long an interval as above instanced, *retain their original size and colour, and appear distinct in character from the cicatricial tissue formed by them.* This has its drawback when we consider transplantation of the skin as an aid to plastic operations on the face, where a neat result is looked for, though I have no doubt it is useful here in some degree. Doubtless, when the process was originated, surgeons were more sanguine as to its doing away effectually with scars, contractions, and deformities. At this happy result we have not yet arrived, nor are we, apparently, nearer its full attainment. It is certain, however, that very considerable advantages may be derived from skin grafting in suitable cases. From inquiries I have made, it does not seem to be as much employed by surgeons in provincial practice as it ought to be, considering its simplicity and usefulness. For my

part, I have found it to work satisfactorily in private cases, where its employment was indicated; the patients feeling interested in this simple yet marvellous process, and gratified at its results.—*Medical Press and Circular, April* 13, 1881, *p.* 311.

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## 55.—ON THE LAWS OF INHERITANCE IN RELATION TO DISEASE.—SMALL-POX AND SYPHILIS.

By Prof. Jonathan Hutchinson, F.R.C.S., &c.

*Small-pox.*—At the time when small-pox was a much more common disease than it is at present, there existed a general belief to this effect, that a pregnant woman who contracted variola might communicate the disease to the fœtus she was bearing. Although there may exist now a doubt in some quarters concerning the accuracy of this belief, the principle is, nevertheless, well established, that specific fevers may be, and are, communicated from mother to child during the period of gestation. From innumerable observations relating to small-pox infection, there have been deduced an array of facts which have a most important bearing to the student of heredity, and not least among these is that which has proved the variation between the periods of incubation of mother and child, amounting, in some cases, according to Dr. Streeter, to eight or ten days, the demonstration of this lying in the evidence afforded by mother and child respectively, the one presenting the desquamative, the other, the eruptive stage, at the time of birth of the child. During the transfer from mother to fœtus, some inexplicable change is exerted over the virus, whereby its influences are modified to the extent of affecting its power to set up its specific effects. The experience of obstetricians in connection with this subject, possesses much interest; and we have the evidence of Morisso, that he was born with small-pox pustules on his body, his mother having exhibited no signs of being attacked by the disease. On the other hand, there have been recorded several cases in which the children of parents who have had small-pox during their pregnancy, have been born with protection against the disease; and there are other records of twins born under the same circumstances, one of whom has been afflicted at birth with the disease, while the other escaped its influence. The proof that these are veritable cases of intra-uterine affection is further found in the effects of vaccination, which, on one of such twins, will be efficacious, being without result on the other. The intra-uterine protection may lose in effect in time, and instances of this are to be found in those cases where, in children born covered by the scars of small-pox, inoculation is successfully performed early in life; some such cases in which this operation has succeeded in the third or fourth year being related.

Variola may be accepted as the best example of specific contagious fevers; and the facts true about it, may, with much probability of truth, be asserted of all the fevers of which it is a type. Fœtal affection through the mother, however, does not always take place as a consequence of the latter contracting a specific fever, but in every case of such transference, the element of time intervening between the period of contagion and the period of exhibition, is of the utmost importance; and particularly so in regard to syphilitic disease.

*Syphilis.*—The *particulate* theory of *syphilis*, that, viz., its transmission is due to the direct carriage of minute particles, as in the exanthemata generally, and not by fluid contact, is that theory alone on which it is possible to explain all the observed phenomena of the disease.

In regard to syphilis, certain oft-quoted statistics are too familiar to need repetition, while the enumeration of isolated cases can have no value in determining conclusions bearing on its influence and effects; unusual cases, also, which are interesting in themselves, generally admit of explanation as being fallacious in some important respect; and what will have the greatest weight and weightiest bearing on any inquiry concerning syphilis will always be general impressions formed from widespread experience of large numbers of cases. The conclusions justified on these grounds go to show that, contrary to the opinion formerly prevalent on the communicability of syphilis from father to offspring, it is distinctly heritable, and the child of a syphilitic father and perfectly healthy wife may be, and, in fact, frequently is, born with unmistakable symptoms of primary syphilis, the infection having resided as a *particulate* virus in the male element or sperm cell. In dealing with this question the term inheritance may be advisedly replaced by the expressions "germ-infection" and "sperm-infection," to signify infection of the child through the mother or father respectively, as a consequence of their blood-contamination by the elements of syphilis at the time of impregnation. The process is thus one of real contagion, and the consideration of it is surrounded with all the difficulties that beset the discussion of any ordinary question of contagious infection. In the same way as an adult or other person may escape the influence of contagion in his immediate neighbourhood, so the fœtus resulting from a fruitful intercourse between two persons of opposite sexes, one of whom is the subject of syphilis, may escape its influence. A woman, however, who has recently contracted syphilis will bear a syphilitic child, but a distinction must nevertheless be drawn between "germ-infection" and "fœtal-infection," the latter being consequent on the mother's contraction of the disease subsequently to

conception, the time intervening being immaterial to the result. In such a case the child suffers in the same way as though germ-infection had occurred, the development of the disease being the same in either case, judged by the symptoms observed after birth. This has been proved by numerous observations conducted by Mr. Hutchinson, one case having been watched by him for sixteen years. In this the date after conception at which the mother got her chancre was known to him, and the symptoms exhibited by the child pursued exactly the same course as if it had received the syphilitic taint by direct contact at the earliest possible period. This subject, indeed, is one in which much careful investigation is required, and will repay labour spent on it; and it will be well in connection with it to adopt the term "infantile syphilis" as more appropriate than "inherited syphilis."

The evidence bearing on the fact that the father can transmit syphilis to his offspring is overwhelmingly convincing, and facts have proved beyond all possibility of doubt that children born of a syphilitic father and non-syphilitic mother may be themselves syphilitic. The continuance of an opposite opinion can only be regarded as a survival of the old superstition, to the effect that the office of the male parent during the procreative act is a very imperfect one.

If *both* parents are syphilitic the course of the disease in the child is in no degree more severe, but its occurrence is more absolutely *certain*. Some persons formerly believed that the parents transmitted their disease to their offspring in the same stage at which it existed in them; but this is emphatically contradicted by almost universal experience. It runs the same course in all children alike, though that *younger* children may possibly suffer to a less extent than the older ones in the same family, was an opinion Mr. Hutchinson once entertained, but has modified, in accordance with his observation of cases, to the belief that older children suffer much more *constantly*. Although younger ones, if affected at all, suffer equally with the more senior members of the family.

The confusion of meaning attached to the term "tertiary stage," makes it a difficult matter to discuss the liability to transmission of syphilis in this stage. It may be accepted that the tissue changes initiated when the tendency to cure no longer marks a secondary stage, are *not* transmitted; and more than this it is hardly possible to say, until a consensus of opinion agrees to assign definitive meanings to the expressions, which, used in their present acceptation, vary almost with every observer who employs them to give an account of his investigations.

The effect which syphilis produces on the fœtus *in utero* vary

within very wide limits. At times its life is entirely destroyed, and abortion results. In the majority of cases, however, the syphilitic virus is absorbed into the body of the fœtus, and develops no change in it until a definite period after birth has ensued, this time admitting of incubation of the poison during extra-uterine existence. It is thus unusual for a child to be born with the signs of syphilis actually on it; but such exceptions do sometimes occur, and in the present state of our knowledge it is impossible to account for them. The symptoms ordinarily present are well known; they approximate to those of the secondary stage in the adult, but with a much increased frequency of severe bone diseases, as has been demonstrated by recent researches in England and on the Continent. The distinctions apparently thus set up are only apparent, and as, for example, between rickets in children and bone affections in the adult, are due to the different soil in which the poison is sown in the two subjects.

The confusion, it may be added, which has arisen by associating together syphilis and rickets, is due probably to the common occurrence of the two diseases in young children.

Children born with the syphilitic diathesis may run through the secondary stage, and remain for a length of time perfectly healthy. Then, by-and-bye, changes in their tissues will take place; interstitial keratitis may evidence itself at any time up to thirty years of age. May this be looked on as a fresh outbreak of virus lurking in the blood? Then, again, recovery may ensue, and the body remain subsequently perfectly healthy. This series of events occurs only in such as have been born with the disease present in them; never in the case of those who have *acquired* it. As a general rule, the symptoms of inherited syphilis pass quite into abeyance, first coming quickly to a head. It may coexist with scrofula, psoriasis, &c.; and in such cases it may be cured, leaving the skin disease behind; or it may *simulate* them—a point of great importance in its bearing on the question of treatment.

The latency of the secondary period when it occurs is to be ascribed to the influence of some counteracting remedy; and as it is a very unusual phenomenon, all accounts involving belief in it should be cautiously received, such as those—*e.g.*, in which children are said to be covered with an universal eruption, at a time considerably later than it should have appeared, in accordance with the known laws of syphilis.

The latency of *tertiary* symptoms may be delayed indefinitely, as in the adult; and the occurrence of nodes may be set down as due to a relighting-up of the disease. The nervous system is often, too, affected after prolonged latency, while the resulting condition may be almost indefinitely varied.

The question whether a severe attack of syphilis in the parent will produce a severe symptom in the child is effectually settled. No difference is produced in any way, and the prevalence of the opposite opinion is due to the fact that the child inherits the idiosyncrasies and constitution of the parent, with the syphilis, the course of which may be modified thereby. Also the popular impression that a *recent* attack in the parent affects the child, is true only in so far as it renders the *liability* to infection *certain*. The course run by the disease is precisely the same as if due to an old infection. The difference of degree with which different children are affected is to be ascribed to constitutional peculiarities and idiosyncrasies.—*Medical Press and Circular, July* 27, 1881, *p.* 65.

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## 56.—ON THE USE OF IODOFORM IN DISEASES OF THE SKIN AND OF CROTON-OIL IN PORRIGO DECALVANS.

By W. Frazer, F.R.C.S.I., M.R.I.A., Dublin.

The favourable results obtainable from using iodoform, as an external application in the treatment of cutaneous diseases, attended with excessive secretions, are so decided, that I feel convinced it will soon come into general use. It has been employed by me extensively, in private practice, for upwards of a year; and I am assured, by continued observation, of its safety, and the great advantages resulting from its action. It may be easily applied in ointment of any desired strength, mixed with either lard or vaseline; and it appears impossible to claim for either a decided preference. The strength of the ointment made use of has ranged usually from ten to thirty grains of iodoform to the ounce of cerate, but double this quantity can be applied. It has proved a most useful remedy in healing local eczematous eruptions, occurring in strumous children and young people, and in cases of impetigo; and I have also treated with it several unhealthy ulcers with fair success. The strong peculiar odour of the iodoform is seldom objected to, by some even liked; and in only one instance, that of a young lad attending school, was any obvious dislike shown to its continued application. He said he did not wish to use it during school-hours, on account of playing with his schoolfellows, who remarked the strong scent; but he admitted it was healing his eruption, and was quite willing to continue it if permitted to apply the remedy when at home in the evening.

I feel also desirous of directing special attention to the properties it possesses of promoting the cure of that very troublesome affection, porrigo decalvans. The best results that I have, as yet, obtained in this disease, have followed the application of vesicating collodion over the affected spot, and for a short

distance around it. Previous to this it is well to epilate all diseased hairs over the spot; and, when the blister is healing, the ointment of iodoform should be applied night and morning, or oftener; and, by this treatment, the hair soon reappears in a healthy condition. A few weeks since, a case came under my charge, where croton-oil had been applied with exceptionally disastrous results, and which may serve as a caution against its use. The little sufferer, a strumous child of about six years of age, had some diluted croton-oil rubbed into the spots of porrigo scattered over her head; it produced violent local irritation, which extended over the entire scalp and the face, where confluent patches of exudation formed, and much of the back of the neck was also affected, the glands of the neck becoming swollen. The entire body and limbs became of a deep-red colour, like scarlatina or erysipelas, and studding this were numerous suppurating points. This affection may have originated through the child applying its hands to the scalp saturated with the croton-oil, and then transferring the irritant to the rest of the body; but I am inclined to think this would only explain some of the results, and that there was an outbreak of cutaneous rash, like what we see in acute eczema. At all events, the condition was one of extreme misery; and the poor sufferer was equally distressed in mind, declaring she would go "mad" with the constant burning pain, tingling, and irritation. I applied vaseline over all the body, as in a case of extensive burn; and, after a fortnight, the attack subsided, the cuticle desquamating. The ointment of iodoform was then used for the eruption of porrigo, which, it may be stated, was still increased and extending, dispersed through the hair in scattered patches; the result, after a time, was all that could be desired. It is needless to describe the constitutional treatment which was employed at the same time. It is well to be cautious in applying croton-oil, unless with great care and discrimination; some skins possess an exceptional degree of sensibility to the action of this irritant, which is quite capable not only of affecting the special parts to which it is applied, but, in such individuals, of originating an acute dermatitis over the entire body, as it did in this girl.—*British Medical Journal, July* 16, 1881, *p.* 80.

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## 57.—ON RECENT ADVANCES IN THE THERAPEUTICS OF DISEASES OF THE SKIN.

By W. Allan Jamieson, M.D., F.R.C.P., Lecturer on Diseases of the Skin, Edinburgh School of Medicine.

It has frequently struck me when reading over works on therapeutics, how small a space comparatively is in general devoted to the actions and uses of drugs when applied to the

surface of the body, as compared with that set aside to the supposed influences they exert when swallowed or otherwise brought into contact with the mucous surfaces of its interior. I say supposed, because though the mode in which some few substances so introduced act on the economy has been pretty satisfactorily worked out, there are still a vast number concerning the *modus operandi* of which we know very little indeed, some nothing at all. True, while certain remedies are taken under certain diseased conditions, certain results may with tolerable accuracy be predicated to follow, but in which way this is effected theory even does not in all cases explain. In the case of internal medicinal agents, the difficulty of unravelling this action is great, and all the more so, because in this country, through the influence of a misguided sentimentalism, experiments on the lower animals are practically prohibited; but the same difficulty should not be experienced to anything like the same extent in the case of external remedies. Take sulphur, for instance, when swallowed in a sufficient dose it acts as a purgative. In smaller and continuous doses it seems to increase the amount of water excreted by the skin, is a so-called diaphoretic, at all events it appears in the sweat, probably as sulphuretted hydrogen, for under such circumstances it blackens silver coins and ornaments. But what is its action when applied as a paste or ointment to the surface of the body? The answer to such a question would be in the majority of cases, "it cures scabies and is good for acne." In the first case, probably the heat of the body oxidises some of the sulphur, and as sulphurous acid it acts destructively on animal life; in the second, a different explanation must be given. Sulphur when applied to the surface of the body acts as an irritant and stimulates the cells of the rete Malpighi to a more rapid growth. Hence, when indirectly used, an increase of the normal desquamation of the cuticle and of that of the endothelial cells of the glands of the skin takes place. In acne this normal exfoliation is always sluggishly performed, and thus the stimulant action of the sulphur leads in time to a healthier condition. We may even go a step further, and maintain that so applied sulphur rouses the muscular element of the skin to more active contractility, and thus diminishes the passive hyperæmia of acne rosacea. One of the most active of the sulphur compounds, the sulphide of calcium, has been much praised by Ringer, in what may be called the furuncular diathesis, as hastening the maturation of those boils which have already appeared, and lessening the tendency to the formation of fresh ones. Bulkley has particularly insisted on its value in hordeolum or stye, several of which are so apt to form on the eyelids in succession. Sulphide of calcium is very unstable salt, and it may well be that the sulphur set free from the calcium

may in its nascent condition exert a special influence on the peri-glandular plexuses, and on the migration, fatty degeneration and death, of the exuded leucocytes. This, however, is but a theory; and while I believe that no one can satisfactorily use a remedy without a theory as to its mode of action, still this is not the place for airing hypotheses, but for placing before you ascertained facts.

In the treatment of skin diseases we rely much on ointments, as these have certain valuable properties not possessed by lotions or liquid applications in general. In conditions of chronic inflammation of the skin, the long-continued congestion leads to thickening and induration, which prevents the sebaceous and sudoriparous glands from performing their proper functions, so that the surface is not lubricated, and becomes dry, hard, and brittle. The oily material must be artificially replaced. Now in doing this the great difficulty has been that animal fats, of which prepared lard was the usual representative, and also most vegetable ones, soon became rancid, all the more rapidly when combined with metallic oxides or salts, and at the heat of the body. The fatty acids so engendered irritated and excoriated the skin, and the ointments often did more harm than good. At first, attempts were made to prevent the lard from becoming rancid by adding preservative ingredients, as benzoic acid, in Mr. Erasmus Wilson's zinc ointment. This was an advance, but benzoic acid is itself irritating. The Americans with their usual ingenuity came to our aid, and in vaseline, a refined derivative from the destructive distillation of petroleum, we have an almost unchangeable substance, not irritating, and of elegant appearance, which has almost replaced lard in the preparation of ointments. It has, however, one fault; it wants solidity, and is often best used in combination. An almost perfect basis for ointments is made by mixing cold cream, made from oil of almonds, white wax and spermaceti, with vaseline, in suitable proportions. This will scarcely turn rancid, and is solid enough at all temperatures, so that when it is desirable to keep up the action of an ointment for many hours without disturbing the surface, this suits much better than simple vaseline. Vaseline is volatile at the temperature of the body, yet when a thin ointment is needed, as in applications to the scalp, there is perhaps no better basis than vaseline alone.

In many disorders of the skin one of the most troublesome symptoms we have to deal with is what is known as the sensation of itchiness or itching, and could we cure this, the disease itself would ofttimes disappear. Before saying a little on the more recent means of relieving it, let us try to understand what causes it. It must arise from some irritation of the extreme peripheral terminations of the sensitive nerves. Now the

medullated nerves distributed to the skin pass through the corium, and either end in special organs, as the pacinian corpuscles, the end-bulbs of Merkel, or tactile corpuscles; or, losing their medulla, they form "a subepithelial plexus from which certain fibrils enter the rete Malpighi, where they branch and form a delicate terminal network lying in the intercellular spaces. "It would seem that it is these little nerve fibrils which, when their condition of stability is disturbed, occasion the phenomenon of itching. Various conditions may induce this instability; either too rapid a current of blood through the superficial capillary plexuses, as in the sudden hyperæmia of urticaria, may occasion this, or quite the contrary condition—too slow a movement in the venous radicles, as in legs with varicose veins. Certain morbid products or unnatural substances circulating in the blood irritate the peripheral nerve twigs and cause itching, as bile pigment in jaundice of some standing. Some think that it is the bile pigment, becoming oxidised on coming to the surface, which causes this; it rather seems to be due to persistent contact of the bile pigment with the nerve fibrils; hence pilocarpine washing it out from within has been successfully used by Professor Maclagan in icterus, by Simon and others in prurigo and pruritus, where it renders the cells of the rete more succulent and improves their nutrition. In nearly all cases itching is a symptom of superficial irritation. It is met with in healing ulcers when the film of horny cuticle is closing over the granulations and the new and juicy cells are being compressed for the first time from without, or by the conjoined pressure from within and from without, since the further outbudding of new capillaries, due, as Mr. Hamilton believes, to unresisted pressure from behind, has been prevented. The itchiness of the skin when there are varicose veins or capillaries in the leg, has been most clearly explained and accounted for by Kaposi, an itchiness which is in many cases the first indication of a future outbreak of eczema there. It may be remarked here how very seldom—scarcely ever—any complaint of pain as an accompaniment of eruptions of the skin is made. The nearest approach to it is perhaps the sensation of burning or heat in the early stages of eczema. Pain in the skin only occurs when the sensitive nerve fibrils are continuously compressed by some new growth, as in carcinoma or sarcoma of the skin which has lasted some time; or when, as in irritable ulcer, a fibril of a sensitive nerve is exposed probably unprotected by its sheath on the surface. This, as Mr. Hilton has shown, is relieved by finding out the acutely tender part and dividing the nerve behind it. We have already alluded to the use of pilocarpine in relieving some forms of itching. When, as in urticaria, too rapid a flow of blood through the skin seems to

be the cause, all means which keep the body cool diminish this symptom. Hence the value of vinegar or alcoholic lotions, which promote evaporation from the surface, and the disuse of flannel, which, being a non-conductor, hinders exhalation, while its rough texture stimulates the skin and favours congestion. Then we have remedies which coagulate the albumen of the tissues, as carbolic acid and tar, and thus deaden sensation; both penetrate a short way into the epidermis, and while carbolic acid is the more rapid in its action, it is, from its volatility, also the least permanent. Camphor has long been known as an antipruritic of some value, but when combined with chloral hydrate, forming a liquid, its efficiency is much increased. It may be painted on pure, or used diluted with two or three parts of vaseline. Thus employed it forms one of the best means we possess for the relief of pruritus podicis, when this does not depend on ascarides or any plainly evident cause. But it occasions pain when applied to a part denuded of epidermis. Itching which owes its origin to too slow a current of blood, of which the most typical example is that seen in eczema connected with varicose veins of the leg—but to the same category also many examples of pruritus scroti, labiorum and ani may be referred—is best relieved by careful flannel bandaging, well applied suspensory bandages, and laxative salts or mineral waters, which unload the rectal veins by freeing the portal circulation, combined locally with weak tarry lotions, one of the best of which is Wright's liquor carbonis detergens, a well-made alcoholic solution of coal-tar, suitably diluted.

We owe to Mr. Balmanno Squire the introduction of chrysophanic acid as our most efficient remedy in relieving psoriasis. Both Mr. Squire, however, and Dr. James Adams, who wrote an excellent paper on it in the Edinburgh Medical Journal, recommended much too strong an ointment. Mr. Squire still adheres to a formula of two drachms to the ounce. This may do all very well for some pachydermatous people, whose skins react little to irritants, but in general from ten to fifteen grains in the ounce of vaseline is potent enough. Messrs. Macfarlane in the North Bridge sent me a specimen of what they called chrysarobin; whether this differs in aught from well prepared chrysophanic acid I do not know, but it seemed to me, while equally efficacious in curing (for the time) psoriasis, to be less apt to induce the troublesome and alarming erythema, which so often follows too energetic a use of chrysophanic acid. In employing chrysophanic acid for psoriasis it should be remembered that a little of the ointment well worked into the patches, previously cleared of their scales, does infinitely more good and less harm than a great deal dabbed in. Alizarin, suggested by Dr. Adams as a substitute for chrysophanic acid, on ingenious

chemical grounds does not appear to have found much favour, but pyrogallic acid introduced by Jarisch has been of more value, though not well adapted for application to extensive surfaces. Since it does not irritate and inflame the conjunctivæ, it is better suited than chrysophanic acid for psoriasis affecting the scalp and face, and may be used in the strength of one drachm to the ounce. Besides its value in psoriasis, pyrogallic acid seems also to exert a slowly destructive action on some forms of new growth, especially those which are allied in a somewhat natural class grouped round the sarcomata. These it causes gradually to wither away, and opens up a more hopeful prognosis in the case of tumours so eminently apt to recur as those are. I am inclined to think from my experience of its use that it exerts an influence something like tanning. Under its use the growth becomes smaller, denser, and less apt to bleed, and crumbles away in parts. It irritates the skin round the tumour, so that it must be guarded by covering it with a protective with a hole in it just the size of the tumour.

The flexible collodion of the Pharmacopœia has proved itself useful in many ways. In restraining the advance of erysipelas migrans, more particularly in children, I have often found it of great value. When burns of the skin do not advance beyond the first grade a coating of flexible collodion serves to protect the vesications from rupture, and in no way interferes with treatment by cotton wool. Its applicability to the various forms of herpes is well known, but less so its value in chronic eczema of the palms, where it lessens the itching and helps the fissures to heal. I have not found Ferris's anodyne amyl colloid half so valuable as the simple collodium flexile, while its odour is unpleasant.

The late Dr. Tilbury Fox insisted particularly on the use of soothing remedies in various forms of skin disease where there was irritation to be allayed. These may consist of substances in the state of powder, as the carbonate and oxide of zinc, bismuth, chalk, &c., suspended in water, to which a little glycerine has been added. Glycerine when so used must be the best and purest, free from fatty acids, and must be well diluted. Pure glycerine undiluted is an irritant, freely diluted with water is an emollient, and the best remedy we have for that dry and fissured state of the cuticle occurring in the hands and face and legs during frost or when east winds are prevalent. The same softening effect is produced when glycerine and starch are combined in the glycerinum amyli of the Pharmacopœia, the starch here serving both to dilute the glycerine and also to impart its own demulcent properties.

When the epidermis is not renewed with sufficient rapidity, when there is a sluggishness on the part of the skin, the face in

particular looks grimy, the complexion has not its healthy transparency. The cause of this is not primarily in the skin; the organs elsewhere of excretion, of secretion, and assimilation are acting badly, and these demand attention and regulation. But we must also act on the skin and its glands; stimulation is required here as elsewhere. The commonest stimulant used is soap, which always contains more or less free alkali. The alkali acts by causing the albuminous tissues to swell up, the cells thus become separated and are thrown off. Alkalies act chiefly on the superficial strata of the epidermis, when at least, they are only permitted to remain for a short time in contact with them. But the action of acids on the cuticle and rete mucosum has been, till recently, overlooked. Acetic acid in a dilute form renders albuminous tissues transparent, but it has not much effect on the outer horny layer of the epidermis; it appears to penetrate more deeply, absorbs water from the rete cells, and like the alkalies, induces desquamation, but more gradually, and from within outwards. Unna has very successfully applied this to the treatment of "a bad complexion." Where there is some degree of acne punctata and comedones, he employs a paste consisting of four parts of kaolin, three of pure glycerine, and two of vinegar. When this is smeared on the face under such circumstances, the eyes being kept shut during its application, it dispels the acne and comedones, wonderfully clears up the muddy complexion, and prevents the simpler form of acne from advancing to the graver.

Warts on the hands are always disfiguring, apt to become ragged and to bleed, and are very probably contagious: their removal is therefore a matter of importance. Glacial acetic acid, solid nitrate of silver, and other means have been recommended and used, but chromic acid, one to one of water, is by far the best remedy. The skin round each wart is first protected by painting it with oil, and then the wart itself is soaked with the solution of chromic acid; this absorbs water from the tissues, coagulating and hardening the albuminous tissues at the same time, and the unsightly warts soon disappear. These warts seldom appear after puberty on the hands, but a healthy girl well grown, aged fifteen, came to me some time since with dozens of them on her hands, which had annoyed her for six years. Of course they much interfered with work, being always in the way. Steady use of the chromic acid removed them in a few weeks.

Chaulmoogra oil, which has obtained a certain reputation in India for the amelioration of the symptoms—I will not say the cure—of leprosy has been introduced into this country with the somewhat vague reputation of being useful in skin diseases. It has answered well in my hands in some cases of eczema of the

face which had passed the moist stage and tended to become dry. It seems to act as a mildly stimulating astringent, but its applicability is certainly limited, and experiments with it in Germany recently reported, have not increased its reputation. It is in the strumous forms of eczema of the face in children and young persons that the best results from its use have been attained in my hands, and I have also found it of considerable value in the later and scaly stage of eczema of the scalp. The form in which I have used it has been as an ointment in the proportion of a drachm to the ounce of glycerine, of starch, vaseline, or simple ointment.

The subject of parasitic diseases of the skin has received considerable attention, and also some elucidation of late. Favus has become so rare, and the treatment has been so thoroughly settled, that allusion need not be made to it, and tinea versicolor, though fairly common, is easily cured. But there are two varieties of tinea tonsurans at least which still prove intractable, and to the recent deliverances on these I wish to ask your attention for a little. We only occasionally, and then mainly as a transplanted exotic, meet with tinea trichophitina cruris, the so-called eczema marginatum, where the parasite finds a favourable nidus and suitable conditions for its growth in the warm and moist situation of the inner surface of the thighs and the adjoining parts of the scrotum. There seems to be no better antidote to its luxuriance than freshly prepared sulphurous acid as recommended by Dr. Bulkley. It is of much importance that the solution of sulphurous acid should be fresh, since by exposure to the air, or when long kept, at least unless in a well-closed stoppered bottle, the acid partly becomes weaker from escaping from the water in which it is dissolved, partly becomes oxidized into sulphuric acid, which is an irritant and not a parasiticide. The sulphurous acid sponged freely on the parts several times a day soon lessens the itching, and eventually cures the disease. Any excess of irritation caused by the acid subsides when the use is discontinued for a day or two and some soothing ointment or lotion substituted for it. But while we only occasionally meet with examples of this form of ringworm, nothing is more common than tinea tonsurans of the head in children. When early seen such are in general easily cured by blistering with acetum cantharidis, by the use of glacial acetic acid either pure or slightly diluted with spirit and glycerine, or by Coster's paste—iodine dissolved in colourless oil of tar. But it is far otherwise when the disease has been neglected, or when, owing to some peculiarities to be alluded to immediately, it has obtained a firm hold on the skin. Sections of the skin from parts affected with ringworm have rarely been obtained. Dr. Thin, from observations made on

the skin of a horse, concluded that the parasite lived exclusively in effete epithelial structures. Dr. Robinson of New York, in a paper published in the New York Medical Journal for March, describes and figures the appearances found in skin from tinea tonsurans of the head, and has found the parasite in the corium, the hair-bulb, and even the subcutaneous tissue. He concludes his paper in these words: "The anatomical seat of the fungus in tinea tonsurans capillitii is different in different cases of disease. It may be seated only in the corneous layer, or it may extend even to the subcutaneous tissue. Probably in those cases in which a large number of hairs fall out entire, the fungus extends deeper than in those cases of only stubbed hair. The deep seat of the fungus in some cases is probably the cause of the occasional obstinacy of the disease and difficulty of cure." When the resistance of the tissues is lowered by anæmia, or by the condition we term tuberculosis or scrofulosis, it is easy to understand that the spores and mycelium will make their way further and without inflammatory reaction. The great difficulty in the treatment of ringworm of the head has been that the agents employed for its cure did not penetrate deep enough to reach those outlying spores which were always ready to germinate and reproduce the disease. Evidence has recently been accumulating to prove that for many of those rebellious cases we possess in the oleate of mercury a reliable parasiticide. Dr. Alder Smith recommends it in such cases, and says that only once did he see slight salivation produced by its use. In one of Dr. Robinson's cases, where the fungus was proved by the microscope to be deeply seated, five or six applications of a 6 per cent. solution of oleate of mercury cured it, though it had lasted for four months. We may assume, then, that the oleate of mercury used cautiously is a remedy for tinea tonsurans of considerable penetrating power. But there still remain some cases which resist all the measures usually employed, and for these Dr. Alder Smith has recommended croton oil painted on these patches sufficiently often to produce a pustular eruption, resembling what has been known as kerion in at least one of its forms. When this is done not only do the hairs become loosened and fall out, carrying with them much fungus growth, but the inflammation extends beyond the follicles into the peri-follicular tissue and destroys the vitality of the outlying and deep-seated spores, and renders the tissue no longer a fit soil for their growth. One other remedy for tinea tonsurans needs a single remark, viz., turpentine, which Dr. Foulis has found so useful. In my hands, used as he has advocated, I have thought it an adjunct to other means, but not in itself and alone curative.

Besides the use of medicinal agents in diseases of the skin,

various operative measures have been of late employed in some forms, and these demand a share of attention. Chief among these is that of scraping by means of a sharp spoon or dermal curette, introduced by Volkmann of Halle. The value of this mode of treatment in suitable cases and forms of disease can scarcely be over-estimated. Take lupus, for example. Till recently our means of local treatment consisted in caustics and the galvanic cautery, to which may now be added the thermo-cautery of Paquelin. With two exceptions all the caustics and the cauteries did too much. Tissues still uninjured by the new cell-growth were destroyed along with it, and hence there arose a scar, depressed and tending to contract much, causing additional disfigurement to that already inflicted by the ravages of the disease. Nitrate of silver and arsenic alone act on the cell-growth itself, and leave unaffected the healthy tissues. But the former, though well suited for small nodules of lupus, is a slow and superficially acting caustic, and thus further ravages were made while the curative treatment was progressing. Arsenic again is a painful caustic, cannot be applied to large areas for fear of absorption and toxic action, and has thus found more favour with quack cancer curers than with the medical profession generally. Mr. Marsden has done much to bring it into favour, but not very successfully. And Hebra himself, who spoke much in its praise, did not latterly extensively use it. The spoon has this great advantage, that the surgeon while using it can tell exactly by his sense of touch when the limits of disease have been reached, and healthy or little diseased tissue is being encroached on. The diseased parts in lupus break down with the utmost readiness under the spoon, while the sounds parts offer an almost unconquerable resistance. Indeed with the spoon one can scarcely do too much, one is far more likely to accomplish too little. The cell-growth, infiltrating itself along the vessels, penetrates beyond the reach of scraping, and thus demands other measures for its removal. Though a painful operation at the time, necessitating the employment of anæsthetics for its efficient performance, the pain ceases at once after scraping has been discontinued. It is a bloody operation, but the bleeding is arrested with the utmost ease by pressure. A thin slough separates, then a clean healing surface is left, which generally cicatrizes over readily. Islets of disease are left here and there, however, at the margins of the patch, and within its area, where the cell-growth has penetrated more deeply, perhaps along the vessels of a peri-glandular plexus, or by the communicating vessels which unite the superficial and deep horizontal layers of cutaneous blood-vessels. These are best treated by making many minute punctures with a fine knife, which stimulates absorption by causing small hemor-

rhages into the tissue. These occurring suddenly, excite the tissues to reaction, as an effect of which blood-clot and cell-growth simultaneously are removed. The scar resulting from a successful scraping is smooth, soft, and little if at all depressed below the skin which surrounds it. Equally well suited for scraping are the superficial epitheliomata of skin and accessible mucous membranes, as the lip. In this way the early stages of rodent ulcer can be most satisfactorily treated. These forms are usually long, many years often, before they infect the lymphatics, and may be radically cured by scraping. I have in this way treated several cases of rodent ulcer on the upper part of the face and epithelioma of the lip without recurrence, though years have passed, while the resulting cicatrix was in every way satisfactory. Primary sarcoma of the skin, a rare disease, can be treated by scraping, but from the nature of the morbid growth relapses are more apt to occur than in superficial epitheliomata. In spindle-celled sarcoma, too, the growth resists the spoon, and is by no means so readily removed. It is the custom of some American dermatologists to sear the raw surface with the thermo-cautery after scraping lupus. I have no personal experience of this, but it is certain that there is here again the risk of doing too much by destroying minute areas of healthy tissue, while even in this way we cannot follow the finer ramifications of the disease. The application of a strong solution (forty grains to the ounce) of chloride of zinc to the scraped surface may possibly have some advantage, since it has some penetrating power, but it gives rise to acute biting pain for hours, and does not certainly preclude relapses.

Small fresh spots of lupus, appearing as little red jelly-like nodules rising up from the corium through the epidermis, are admirably treated by the plan suggested by Auspitz. A thickish needle or his puncturing instrument is dipped in iodide of glycerine, one in twenty, and this is plunged into the nodule; slight inflammatory action is set up, and the lupus deposit withers up and disappears, leaving scarcely a trace.

There are perhaps no more unsightly blemishes than the so-called mother's marks, port-wine marks, and flat nævus vascularis, which are so frequently met with in the face. I leave it to obstetricians to explain why these should in a large proportion of cases occupy the *left* side of the face. I cannot give the statistics, but any one may satisfy himself of this by noting the persons affected with this whom he meets in the street. Were we able to remove these marks, or even to convert the red or purplish stains into a white surface, we should have no lack of candidates to be operated on, and it almost seemed, a couple of years ago, that this was in a fair way of being accom-

plished. Mr. Balmanno Squire about that time announced that he had, by means of multiple and repeated fine linear scarifications, obliterated, or nearly so, one of those marks. Mr. Squire based his suggestion on the fact that such multiple scarifications were of value in the acquired telangiectasis met with in acne rosacea, where the dilated vesicles withered up and disappeared under their employment. The linear incisions were to be made, according to Mr. Squire, at different angles to each other at each repetition of the operation. Such a simple mode of procedure, and which promised so much, was soon extensively tried, and among those who adopted it were Dr. McCall Anderson and Mr. Malcolm Morris. Both unhesitatingly condemned it, not only as useless, but as positively injurious, since Mr. Morris found that not only did he not cure his patient after more than a hundred sittings, but some nodules of cicatricial keloid arose, a result which might almost have been predicted. Mr. Squire then said in a second communication that by making the incisions obliquely instead of vertically to the plane of the skin, obliteration of the vessels could be effected. I tried both plans fairly, and can say that so far as my experience went no effect whatever was produced on the nævus. I fear therefore that we have here to do with a case of too-hasty generalization. Some case of port-wine mark may, however, be treated with a fair degree of success by a method recommended by Dr. Sherwell, called by him tattooing. This consists in pricking the surface freely with a bundle of needles dipped in carbolic or chromic acid of a strength of from 25 to 40 per cent. The surface is then dried and sponged with alcohol, and a thick layer of collodion painted on. The operation is neither painless nor instantaneous, requiring to be repeated at intervals of some months, and sometimes leaves a scar; still it appears the best method yet available. The varicose capillaries in rosacea and acne rosacea can undoubtedly be much diminished both in number and calibre by various modes of treatment. One of these is by splitting them up longitudinally as recommended by Dr. Liveing, a fine narrow knife being used. This succeeds best with the larger vessels. The smaller can be punctured with a star or diamond-shaped, or rather headed, needle, as used by Hebra and Kaposi; this lacerates the vessel and destroys its continuity. We can thus obtain considerable diminution of the redness, but the results are not always so permanent as is to be desired.

Another mechanical agent in the treatment of skin diseases of recent introduction is the solid india-rubber bandage introduced by Dr. Martin. These bandages have been specially recommended as curative in eczema and ulcers of the leg. I cannot say much about the latter, but have used them to some

extent in eczema. When used for this they act much like a poultice, the cuticle is macerated and removed, and the surface becomes smooth and clean. Some cases of eczema of the legs can be cured by their use exclusively, others certainly need other and additional treatment, and some they do not suit at all. When the eczema has been of some duration, the limb œdematous and the cuticle thin and friable, vesicles and bullæ, often accompanied with considerable pain, are apt to make their appearance, necessitating the abandonment of the india-rubber bandage at least for a time, and the substitution of a cotton one, or at least of thin muslin beneath a roller of domette flannel. I am sure Dr. Martin is right in insisting on the purity of the rubber used. Whether bandages of as honest a texture as his own are now made in this country I do not know; when Dr. Martin's were first introduced they certainly were not, and as his are now only half their original price, and as good, I make a point of using them.—*Practitioner, Sept.* 1881, *p.* 183.

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58.—ON THE TREATMENT OF ECZEMA GENITALIUM.

Dr. Finny, continuing his "Practical Notes on some Local Forms of Eczema," in the Dublin Journal of Medical Science, deals with this troublesome variety, and also with eczema ani, often closely connected with it. When eczema involves the whole genital region, including the anus and perineum, it mostly commences at the anus and extends from thence forward. As seen on the scrotum, there may either be much thickening and infiltration, or there may be more or less exudation of a sticky secretion. The subjects of chronic eczema genitalium are either adults or past middle life, at least in the majority of cases. Patients often endure a moderate amount of discomfort in these regions before seeking medical aid, and so it happens that when they do they are often far from well in their general health. They may either suffer from dyspeptic symptoms or from those of nervous exhaustion due to loss of sleep, and to nervous depression as a result of intense itching and the scratching to relieve it. Dr. Finny finds lotions often suit better than ointments and gives the following two useful formulæ:—℞. Lin. calcis. ℥iv.; ext. bellad., gr. xij.; zinci oxidi, ʒ ij.; glycerini, ʒ j.; aq. calcis., ℥iv. To be applied at night, after bathing the scrotum in very hot water. During the day, dust with a powder composed of bicarbonate and oxide of zinc and starch.

Another formula useful in eczema rubrum vulvæ is—℞. Lin. calcis, ℥iv.; acid. hydrocyan. dil., ʒ iv.; liq. plumbi subacet. ʒ ij.; glycerini, ʒ ij.; aq. rosæ, ad ℥viij. Pruritus ani is often associated with eczema genitalium, and may be its starting-point, and

hence it is well to look for fissure or ulcer of the rectum or hemorrhoids, as unless these, if present, are cured, the treatment directed to the pruritus will fail. In many cases of eczema ani there is a strong gouty tendency, and an outbreak may be induced or aggravated by even the moderate use of malt liquors or port wine. By a regulated temperate dietary, into which fish may largely enter in place of meat, by total abstinence from port and brown sherry, brandy, and malt liquors, and by saline aperients, with colchicum, Dr. Finny has reduced the disease to most moderate limits, and cured it by subsequent use of oleate of zinc or ung. hyd. ammoniat. When the nervous system is much depressed, phosphorus, alone or with iron and strychnia, does good; but a complete change and rest from business is often needed to cure.—Dr. Allan Jamieson, *in Edinburgh Medical Journal, Aug.* 1881, *p.* 183.

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## 59.—ON THE TREATMENT OF LUPUS BY SCRAPING AND PUNCTURE.

By Alfred Sangster, B.A., M.B.Cantab., Surgeon to Charing Cross Hospital, London.

Although the treatment of lupus by mechanical methods has been introduced into this country for some years past, yet it does not appear to be so widely practised as its simplicity and efficacy would seem to warrant. Some details of a few cases so treated may be of interest. Volkmann was the first to draw prominent attention to the treatment of lupus by scraping. For the purpose, different sized and shaped spoons, or scrapers, are used; those employed in the cases about to be reported are useful patterns, viz.:

1. A small spoon with an elongated, oval, and somewhat deep bowl, set on a short shank, and mounted on a hexagonal handle. The instrument was devised by Mr. B. Squire.

2. A larger instrument with a broad and shallow bowl, set at right angles to the shank, and attached to a short, roughed, and flattened handle; this is more suitable for scraping large surfaces. It is known as Hebra's pattern. The edges of all these instruments are blunt.

Scraping has for its object:

1. The removal of products of secretion, scabs, crusts, &c.

2. The removal of neoplasms formed in or on the skin.

It is very difficult to make any impression on the sound skin with such blunt instruments, and on this fact the simplicity and safety of scraping mainly depend.

Speaking generally, the more the skin departs from the normal and is rich in cell elements, the easier is it attacked by the scraper. A difference is at once appreciated by the touch, as the

spoon tears away the soft, friable neoplasm and reaches the tough fibrous structures of the skin. It is almost impossible to do harm, all that can be made to break down (using moderate force) under the scraper or spoon is best removed.

The second mechanical method employed by Volkmann is that of "Multiple punctiform scarification." As is well known, such treatment has been employed in medicine and surgery, from very remote times, for various purposes; Volkmann employs it in the treatment of lupus.

1. To destroy newly-formed vessels.

2. To favour absorption of neoplasm by traumatic irritation of the part. It is practised by making hundreds or thousands of punctures close together, about two lines in depth. For this purpose a narrow-bladed bistoury may be used, or the same end gained in less time by employing an instrument composed of two or more knives set close together.

This treatment is more applicable to non-ulcerated parts where the cell-infiltration is diffuse, or where the part is abnormally swollen and vascular. Such tissue might in some cases be made to break down under the spoon, but less scarring or deformity results if the neoplasm can be made to disappear by the puncture method.

Either process may be supplemented by the application of caustics, such as carbolic acid, chloride of zinc, caustic potash, nitrate of silver. And indeed it is only rational to follow up the scraping by the application of caustics, because in most cases there must exist, deep in the skin, prolongations of lupus tissue extending from the mass on the surface along the hair follicles, and other vascular structures; these are out of reach of the scraper and would be attacked by a caustic. It is probable however that such deposits also become absorbed by the traumatic inflammation set up by the scraper.

Of course in a diathetic disease like lupus it is not to be expected that simple destruction of morbid products on the surface will confer any permanent immunity from relapses. All that is claimed for these methods is that they are simple and efficacious, and protect longer from relapses than other methods employed for a like purpose. Immunity from relapse in this disease can only depend on the modification of the patient's whole constitution, often by means including hygienic procedures, difficult if not impossible to carry out amongst patients, such as those whose cases are briefly narrated in this paper.

*Case* 1.—J. P., female, æt. 29, single, draper's assistant, came into Charing Cross Hospital under my care June 3, 1879. Her family history was of some interest. Both parents were said to have died of consumption, the mother at 35, the father at 47;

the latter had swollen glands in the neck. One of the patient's sisters has had swollen glands in the neck, and presents more scars in this situation than the patient. This sister has also had a skin disease similar in character to that about to be described. It is probable that two other sisters have suffered with strumous affections.

*On admission* the patient looked ill and drawn, her complexion was muddy-looking, and on the left cheek were four or five small scars arranged in a cluster. These, she stated, were once the seats of a skin affection like that she had on the arms. Beneath the chin and behind the rami of lower jaw was a string of scars, five or six in number, the positions formerly occupied by suppurating glands. The cicatrices had the usual puckered look, but were quite sound and void of activity. The left hand, forearm, and arm presented variously sized patches of lupus. The entire surface of the back of the hand was affected, and there was a patch three or four inches long on the front of the forearm; other patches, four or five in number, were disposed about the arm and forearm, one the size of a half-crown piece was seated over the elbow. The disease was of that variety known now as "Lupus serpiginosus exulcerans," and presented the varied appearances seen in the different stages of that form of lupus. All the patches were crescentric in outline, showing the advance of the disease from separate centres. Some had almost entirely healed; the wheal-like scar being bounded in part of its circumference by a raised livid red border, covered by thin papery scales or greyish-yellow crusts, concealing ulcers and granulation tissue. Nearly half of the diseased surface was however occupied by shallow, discharging ulcers, with weak exuberant granulations. Over the region of the right elbow, extending three or four inches above and below, was a large irregular patch, mostly occupied by scar-tissue, but desquamating and crusting in a few places. The patient had had this trouble with her skin for more than twenty years, and had been under medical treatment, off and on, seven years.

On June 17 chloroform was administered and the diseased surface scraped. The two instruments above described were used. With the small spoon I carefully picked away the lupus-tissue from the edges of the ulcerating patches, endeavouring to undermine the sound skin. The larger flat spoon was then used to scrape away the ulcerating surface, until the edge of the instrument gave back a scraping or ringing sound as it traversed the inequalities of the tough fibrous layers of the skin. Finally, any overhanging infiltrated skin at the edges was strongly scraped so as to reverse the condition and convert the margin into an inclined plane, bevelled at the expense of the sound skin. The smaller serpiginous deposits were dealt with

by thrusting the small spoon into them and gouging them out of the surrounding sound tissue by a rotatory movement of the spoon. As the granulation-tissue was broken up there was considerable bleeding, which, however, soon ceased. The open wounds were covered with protective and dressed with carbolized gauze (the scraping having been done antiseptically). A large pad was placed in the palm and the fingers closed over it, so as to cause the open wound, which involved almost the entire surface of the back of the hand, to cicatrize in the most favourable position. Beyond occasionally touching any high granulations with nitrate of silver and dressing the part in the above-mentioned way at intervals of two or three days, nothing further was done. The ulcers healed rapidly, and the patient left the hospital at the end of a month with only about a square inch of surface still unhealed. She went back to Biggleswade and I did not see her again for some months, when, being in town, she called at the hospital. At this time the scars were all perfectly sound.

On May 11, 1881, that is two years after the "scraping," she called on me and showed the scars all sound and white, with the exception of two infiltrated spots as large as haricot beans on the back of the hand, which were threatening to ulcerate. From what I could remember the improvement in her appearance was most marked.

*Case* 2.—E. M., æt. 24, housemaid, out-patient at Charing Cross Hospital. A definite history of consumption in her family. When she was 10 years old a swelling appeared on the ulnar side of left hand; it broke and discharged at intervals for seven years. The little finger was then removed for disease of the bone. Soon after the wound healed the skin "broke out" in the old amputation scar, and has continued healing and breaking out ever since. When first seen there was an ulcerating sinuously-edged surface as large as a crown-piece on the back of the left hand, and limited by the scar of the old amputation. Chloroform was given and the surface scraped, June 5, 1879. The wound healed in a fortnight. She took cod-liver oil for many months. Occasionally she attends and has little lentil-sized lupus deposits, which crop up in the scar, destroyed with acid nitrate of mercury.

*Case* 3.—G. B., female, æt. 17, out-patient, Charing Cross Hospital. Scar of former suppurating gland in the neck. Beneath chin a patch of lupus about three inches long by one inch broad, said to have existed for ten years. Chloroform was given and the surface scraped. The disease showing signs of returning, about half the surface was painted with acid nitrate of mercury. The patch subsequently healed and remained sound for eighteen months, when fresh centres began to crop up. The scar over that portion which was painted with the acid nitrate is thicker and not so flat as the remainder.

*Case* 4.—A. S. æt., 10, female. The patient, a healthy-looking little girl, attended the out-patient department with a patch of lupus involving the entire surface of the back of the hand from the knuckles to the wrist. The centre of the patch had cicatrized; the circumferential margin, more than an inch broad in places, was covered with papillary elevations and crusts concealing ulceration. The warty character was most marked, and was perhaps similar to what was seen in a case alluded to by Mr. Erasmus Wilson (Lectures on Dermatology, 1874, p. 35), and named by M. Hardy, of Paris, "Scrofulide verruqueuse."

The disease in my patient was said to have been present many years. There was nothing of interest in the personal or family history. There was a small abscess in the front of the forearm, most probably a gland suppurating from the effects of irritation. She was taken into the hospital on June 11, 1880. The crusts poulticed off, the back of the hand dressed with lead lotion, and the arm put in a sling. A week afterwards, the lupus patch being much quieter in appearance, it was scraped by Mr. Baker, the house-surgeon, under my directions, the abscess being opened at the same time. The operation was done under chloroform and antiseptically.

On July 1 the patient was discharged, and on July 12 she attended for the last time. The wound healed very satisfactorily, and now, about a year after the operation, the father reports the child as being quite well and the scar still sound. A portrait of the disease was taken.

*Case* 5.—The last case was that of a youth, J. S., æt. 17. His mother and father were healthy—he had nine brothers and sisters all healthy—there was nothing the matter with the patient with the exception of his skin trouble.

About two and a half years ago some coloured fire exploded in his face; the nose afterwards remained red and swollen, the following winter it became worse, seemed to be affected by the cold weather "as if chilled," got better in the summer, the swelling subsiding for a while. About a year ago the nose being swollen, red, and scaling, he placed himself under medical treatment, part of which consisted in the weekly application of caustic. Despite this the disease gradually advanced. He was admitted to the hospital on Feb. 8, 1881, and is reported as being "a rather weakly youth with a pasty complexion." At this time the nose, upper lip, and cheeks were affected with lupus. The nose over its upper portion was infiltrated and desquamating, the tip and alæ were nearly twice their natural size, being the seat of fungating, exuberant lupus growth; here and there the surface was ulcerating and covered by crusts. The disease involved the septum and extended into

the nostrils, the upper lip was also invaded beneath the nostrils to an extent of surface the size of a sixpenny-piece, there was an isolated patch on the upper lip over the angle of the mouth, round, crusting, as large as a threepenny-piece. On closely inspecting the face, the cheeks were seen to be sown with small pin-head apple-jelly-like lupus deposits beneath the surface, and most numerous in the neighbourhood of the nose. About Feb. 11, the patient being under chloroform, the lupus growth was scraped from the tip and alæ of the nose; although the infiltrated surface on the upper portions of the nose could be made to break down easily under the scraper, it was left for after-treatment. The ulcerating surface of the nostrils and septum was scraped, also the patches on the upper lip. The small spoon was used to gouge out the largest of the apple-jelly deposits on the cheeks. The part was dressed with lead lotion. The next day, the scraped surface looking puffy and very vascular, it was very freely rubbed with a stick of nitrate of silver. In about a fortnight the scraped surface had skinned over and presented a similar appearance to the infiltrated surface involving the upper portion of the nose. It was curious to note the less active condition of the disease on the cheeks, many of the small apple-jelly deposits which were not interfered with had disappeared. A puncture instrument made for the purpose by Mr. Weiss, of the Strand, was now used. It consisted of four lancet-pointed small knives arranged with their flat surfaces parallel, at intervals of a line apart. Projecting shoulders on the two outside knives prevented their being inserted more than two lines beneath the surface. With this instrument the infiltrated surface of the nose (at first the portion which had not been scraped) was punctured, until on wiping away the blood the individual punctures were so close together that they could scarcely be discerned, and the part had a minced and livid appearance. The remaining surface was punctured at intervals of ten days or a fortnight on three subsequent occasions. The part being paler and less infiltrated each time. Care was taken to thoroughly puncture the infiltrated surface on the borders of the alæ and septum. Lead lotion was used after each puncturing. Throughout, the nostrils were kept well distended by sponge plugs, so as to avoid contraction during the cicatrizing stage as much as possible. For this purpose also Mr. Weiss devised a pair of hollow silver nostril dilators adapted to a spring. The sponge plugs were, however, much preferred.

The patient took ol. morrhuæ during his stay in the hospital, and for about the last fourteen days a mixture containing—Syrup. ferri. iod. ʒ i.; tinct. iod. ♏iii.; pot. iod. gr. v.; recommended in lupus by Dr. Liveing. He left on April 14,

being advised to take as much out-door exercise as possible, but to keep the nose protected from cold or heat. Since leaving he has been taking the iodine mixture twice a day, and ol. morrhuæ ʒ ii. every night. An ointment containing yellow oxide of mercury (gr. vi.—ʒ i.) has been applied latterly. The nose is now firmly cicatrized, here and there showing a discoloured patch of partially absorbed infiltration. There is very little deformity present, and that chiefly noticeable in profile as a slight depression of the cartilages. The sponge plugs are still worn.

In this case the disease appears to have been localized by injury. The inefficient cauterization tended to cultivate the disease rather than destroy it. The locally infective nature of the disease was well seen in the isolated centres which were springing up in the neighbourhood of the most active portion. Neither in this case nor in Case 4 was there any evidence of struma, direct or indirect, obtainable according to the patient's statements, while in the first three cases there were signs of strumous affections of the glands, and in two instances other blood relations had suffered with strumous ailments.

My thanks are due to my friend and colleague, Mr. Bellamy, for the opportunity of treating some of the foregoing cases in the ward.—*Practitioner*, *July* 1881, *p.* 26.

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## 60.—ON THE TREATMENT OF ACNE.

By Walter G. Smith, M.D., Physician in charge of Department for Diseases of the Skin, Adelaide Hospital, Dublin.

In speaking of the treatment of acne I have no intention of discussing the subject fully, but will content myself with submitting for discussion the line of treatment which has given me successful results in a considerable number of cases. It will be convenient at the outset to indicate the principles which guide me in the management of acne. I am satisfied that many cases of acne can be successfully treated by local measures exclusively, and unless there be plain indications I do not, as a matter of routine, prescribe constitutional remedies. In other words, I believe that many examples of acne are nothing more than local inflammations of the sebaceous follicles and their surroundings, in the same way as we frequently meet with local inflammations affecting chiefly the hair follicles, constituting one of the forms of disease included under the ambiguous term sycosis.

But I do not for a moment ignore the modifications impressed upon acne, as on most other affections, by peculiarities in the health of the patient, nor deny the relation of acne to certain constitutional conditions, especially those of the sexual organs (*e.g.*, menstrual acne) and of the gastro-intestinal tract. In

such cases, in order to expect a successful result, we must endeavour by appropriate means to correct the perverted functions.

From a practical point of view cases of acne fall into three groups :—

1. Those in which retention of sebum (comedo) is a prominent feature.
2. Those in which an inflammatory process predominates.
3. Those in which vascular congestion requires to be specially dealt with.

My remarks will refer chiefly to the inflammatory group; and, for illustration, we will take as a common type of case one presenting a number of pimples, some finely papular, some indolently tubercular, and others suppurating at the apex.

If there be much pus formation the first step should be to gently but freely open with a small and very sharp knife the little acne abscesses. Any troublesome bleeding is readily checked by stuffing the cavity with a pellet of absorbent cotton. With the sluggish copper-coloured tubercles our object is to promote absorption of the products of inflammation, and to stimulate to healthy action without producing a caustic effect, lest scarring should result. For this purpose I used to employ the acid nitrate of mercury, but I have abandoned it in favour of carbolic acid. This agent possesses several advantages. It is an excellent stimulant and pus-destroyer without being powerfully caustic. It tends to numb the part to which it is applied, in virtue of its local anæsthetic quality, and hence it causes less pain than the mercurial salt, and when carefully used it will frequently effect rapid absorption of the unsightly acne pimples without leaving a permanent mark. I usually apply it by means of a glass rod or stick with rounded point dipped into the liquefied acid, and have beside me a piece of blotting paper to sop up any accidental excess of the acid that may fall on the skin. It is important not to overdo it, and immediately after the application it is advisable to cover each carbolised spot with a film of flexible collodion. This not only protects from atmospheric irritation, but also, as is well known, forms a colloid compound with the carbolic acid, and so minimises its irritant action. The patient is directed not to wash off or forcibly remove this varnish (which scarcely shows on the face), and to apply a suitable lotion or ointment twice or thrice a day. The number of repetitions of the carbolic application depends upon the nature of the case, but even in aggravated cases two or three applications will sometimes suffice to remove the most disfiguring portion of the disease.

To expedite the cure it is often serviceable to dust the face at night with precipitated sulphur, by means of a puff, washing it

off in the morning with the lotion. If the skin be irritable or inflamed, I do not know anything that proves so soothing to the skin and grateful to the patient as washing the face with rice milk, prepared by boiling, say, a teaspoonful of ground rice in half a pint of new milk. Patients will derive benefit from this emollient, whom experience has taught that even bran or oatmeal tea are useless, or cause irritation.

Acne on the dorsal region both needs and tolerates more energetic treatment than facial acne. Here we cannot begin better than by ordering diligent frictions with soft soap, or, what I have found to be a cheap and capital substitute, Hudson's Extract of Soap.

In all cases it is understood that comedones are to be extracted by suitable means—*e.g.*, pressure with a watch-key (the edges rounded off), as each comedo may develop into an acne pimple. Steaming the face previously facilitates their removal.

No doubt a few cases will prove unexpectedly obdurate, and relapses will disappoint our hopes; but, even when the affection has persisted in an aggravated form for many years, we need not despair of a complete and lasting cure, in evidence of which I will adduce two cases:—

*Case* 1.—Miss —— was referred to me for treatment by Dr. C. Fitzgerald, May 19, 1879. For nearly *twenty years* she had been subject to acne on the face, neck, and shoulders, and about two months before I saw her a diffuse (eczematous?) inflammation spread over the face. She presented herself with a dusky red eruption on the forehead, cheeks, and chin, the skin being thickened and leathery, scaly, but not oozing, and the itching was not very annoying. Numerous acne pimples and tubercles were scattered over these parts, and also about the shoulders and interscapular region. A soothing lotion (linim. calcis ʒv., glyc. boracis ʒi., zinci oxidi ʒ ij., spir. cajup. ʒ i ss.) was first prescribed. This at once gave relief, and at her next visit the carbolic treatment was commenced. Under this treatment the indolent acne tubercles speedily receded, and she was directed to use an ointment (vaselin ʒ iv., hydrarg. ammon. ʒ ss., sulph. præcip. gr. 20, ol. amygd. am. ℥ij.). A temporary aggravation occurred in the middle of June, but soon passed off. A lotion was then tried (sapo mollis. spir. rectif. āā ʒi., glyc. ac. carb. ʒ ij., sulph. præcip. ʒ ss., ol. amygd. am. ℥iij.), but this proved irritating. She resumed the lime liniment, and was ordered to dust the face at night with a mixture of equal parts of precipitated sulphur and oxide of zinc. Early in July she returned home, having been under treatment for seven weeks. All traces of the eczematous inflammation had disappeared, no new pimples developed, and the skin of her face was soft and smooth, and altogether in a better state than it had been since

the eruption first appeared. By the end of September her face and shoulders were perfectly well, and the skin soft and natural looking, although finely pitted with the cicatrices of old pustules. In a letter dated October 15, 1879, she writes thus :—"I must tell you my face has been in a most delightfully comfortable state, and giving up all treatment has had no ill effect. You have made me a happier and, I hope, a better woman by taking away a cause of constant irritation."

Quite lately I have ascertained that the cure has been a lasting one, and that no relapse has occurred. No internal medicine was prescribed.

*Case* 2.—On June 3, 1879, the Rev. Mr. S., a Catholic clergyman, was sent to me by the late Dr. Rainsford, under whose care he had been for ulcers on the cornea. He was a healthy, sanguine man, aged thirty-six years, accustomed to hard study, and a distinguished preacher. He was a total abstainer, but his face was greatly disfigured, and his nose was a bright fiery red. The eruption commenced when he was about twenty-two years of age, and had persisted ever since. The face was covered with numerous small acne pimples, some of them suppurating at the apex, and latterly the eruption had begun to creep up on the scalp. His appetite was good and his bowels regular. The acne spots were touched with carbolic acid and collodion, and an ointment prescribed (vaselin. ʒ iv., hydrarg. ammon. gr. 20, hydrarg. oxid. flavi, gr. 10, ol. amygd. amar. ♏ iij.). No improvement being apparent after a few days, the following lotion was ordered :—Liq. calcis sacch. ℥iii ss., zinci oxidi ʒ ss., zinci carb. ʒ ss., glyc. acid. carbol. ℥ss. Neither did this prove of much avail, and on the 11th June (*i.e.*, his fifth visit) I prescribed a more stimulating application—viz., sapo. mollis, spir. rectif. āā ℥ij., ac. carbol. ♏ 30, sulph. præcip. ʒ i., ol. amygd. amar. ♏ iv. He shortly left Dublin, and on September 17 called on me to report himself *quite well*, through continued use of the soap lotion, with the exception of a few specks on his head. He was recommended to dust the skin with a powder (bism. subnitr., sulph. præcip. āā ʒ ss., camphoræ, grs. 5). On October 15, 1879, he wrote to thank me for the cure that had been effected. He said—"As far as I can remember, my face, especially the forehead and cheeks, had been covered with a red eruption for the space of some thirteen or fourteen years. I had consulted several medical men, and certainly men of no ordinary standing. If ever I got relief it it was but transitory. I came to you with little faith— a disposition unfavourable for the doctor. However, you have so far succeeded that my face is now quite clear. I never thought to have a smooth forehead again; now it is as smooth as any-

body's. All the redness also has disappeared, and I have a delicate colour such as ladies would prize."—*Dublin Journal of Medical Science, May* 1881, *p.* 398.

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## 61.—ON TROPICAL RINGWORM, OR SKIN FUNGUS.

By James Startin, M.B.Cantab., London.

The tropical ringworm or skin fungus, though rarely seen in England, is by no means an unimportant affection of the skin. It is most common in the tropics, especially amongst the natives of Ceylon, Burmah, West Indian Islands, and the Pacific Islands, but it does not confine itself to these alone, for it is to be found amongst the well-to-do classes, and more commonly amongst men than women. The usual situation is upon the inner surface of the thighs and perineum, the scrotum and buttocks and upon the pubes; it may also be seen about the axillæ and calves of the legs.

*Cause and pathology.*—It is now an undisputed fact that this troublesome eruption, known hitherto by the name of eczema marginatum, is due to a fungoid parasite. not to any degenerative process of the epidermis alone, as has been described by some authors. Kaposi, Köbner, and others I believe now are acknowledging it to be a parasitic disease. From those parts of the body where the folds of the skin come together, as the buttocks, scrotum and thighs, and the axillæ, the secretions are poured out, and afford a pabulum to the fungus, which is increased by tropical heat and moisture. This irritates and macerates the epidermis. We have then a vesicular, eczematous eruption caused, which is secondary to the primary cause. Living in damp situations or houses, sleeping in damp sheets, are no doubt common causes. Who has not seen mould on a sheet that has been put by in travelling? and in tropical climates this is a very active fungus. The parasite differs from the ordinary British ringworm, inasmuch as its growth is much more luxuriant, and it does not destroy the hairs; nor do I find the parasite in the root-sheath of the hair.

*Symptoms.*—This disease begins with an intensely irritable spreading eruption, showing vesiculation and erythema at its margin; its course is very slow and its nature very chronic. Like British ringworm, it spreads in circles, only in a much larger area, and chooses the covered parts of the body for its attacks, and those where the perspiration is poured out the most. It is influenced greatly by the tropical heat, in producing fermentation of the secretive processes of the skin in a peripheral direction, which, no doubt, is the pabulum of the fungus germ. The eruption is slightly above the surface of the skin, beginning at first as a small red and irritable circle, about half an inch in diameter, rapidly increasing in size, with

small bright scales on its surface; or, if in contact with other skin surfaces, is of a greyish or intensely red appearance, increasing in irritability and vesiculation with the progress of the eruption.

*Diagnosis.*—This eruption can be at once recognised, by those who have seen examples of it, by its unmistakable appearance, its situation, and its microscopical appearances. It is liable to be mistaken for gyrate psoriasis, eczema, syphiloderma, intertrigo, and pruritus.

*Treatment.*—Tropical ringworm or skin fungus is a most obstinate eruption to cure. Even if it is relieved in England, as soon as the patient returns to the tropics it is most likely to break out again, unless completely eradicated; at least this is my experience. Oleate of mercury (20 per cent.) is a valuable remedy, or liquor carbonis detergens painted over the affected parts is effectual. Hebra's sulphur and tar application is also good, and Goa powder is much used in India with stated good effects. I use carbolic oil with a few grains of red oxide of mercury with much success.

The following cases illustrative of the disease, which have come under my notice, are typical examples :—

*Case* 1.—A gentleman consulted me for an eczematous eruption and ulcer upon his legs, and upon further examining the skin I found a distinct and well-defined marginate eruption on the inner surface of the thighs and perineum, which he told me he had contracted in the West Indies, and which caused him a good deal of irritation, and that he had never been able to get rid of it. On microscopically examining the scraped skin spores and mycelium were found of large size. I prescribed carbolic oil and a preparation of mercury, which effectually removed the eruption.

*Case* 2.—A man came under my notice at the hospital suffering from a precisely similar eruption on the inner surface of the thigh and buttocks. He had lately come home from Ceylon. I used to this case oleate of mercury (40 per cent.), but had only the opportunity of seeing the case once.

*Case* 3.—A gentleman consulted me with a similar eruption, which he informed me he had had quite twelve years, round the inner surface of the thighs, scrotum, and spreading upon the nates; it was intensely irritable. Upon microscopic examination it was proved to be parasitic. In this case I used a preparation of iodine liniment, oil of Cade, and hyposulphite of soda with much success whilst he was in England, and I have since heard from him that he was very much better.

These three typical cases, and several others I could have noted, are all interesting on account of the parasitic origin of the affection, and the influence that tropical climates have upon the fungoid parasites of the skin.—*Lancet, May* 7, 1881, *p.* 734.

## 62.—THE TREATMENT OF PSORIASIS BY TURPENTINE.

By H. Radcliffe Crocker, M.D., London.

In the local treatment of psoriasis, as in all other obstinate and chronic diseases, a very large number of drugs and methods of procedure, mostly with a view to stimulate the parts, have been employed with more or less success, and often recommended with more than corresponding zeal. No one plan is applicable to all cases. Thus some are actively hyperæmic, and any stimulant at the onset will be injurious; others require only mild stimulation; while a very numerous class require a very strong irritant if anything beyond very slow progress is to be obtained, but that stimulation must be of a special kind. Tar is a well-known remedy of deserved reputation, but it is often very slow in its action, and its disagreeableness is obvious. Chrysophanic acid has acquired a great reputation of late years, on account of the rapidity with which it removes the eruption in suitable cases. Few, however, would care to have it used upon the head on account of the purple colour it imparts to the hair and its producing swelling, erythema, and perhaps conjunctivitis when used near the face. While according to the acid a far higher position than I once did, its drawbacks and limitation have long led me to try other remedies. Three years ago I advocated thymol, and I still use it, especially for the head and face, as it is one of the most agreeable remedies we possess both for psoriasis and ringworm. It is often necessary, however, to use it in the proportion of one drachm to four drachms dissolved in an ounce of lard—*i.e.*, much stronger than I first used it. Still, it is less rapid in its action than chrysophanic acid; and lately turpentine, on account of its being a powerful and penetrating stimulant, occurred to me as an application likely to be of service, the efficacy of the acid seeming to be due to its being a penetrating and diffusive stimulant. Cautious trials were at first made with one or two drachms of turpentine to one ounce of olive oil, but while this was sufficient for some cases, I soon found that pure turpentine well rubbed into the eruption was often advantageous, smearing the parts over with vaseline afterwards to obviate the desiccating action of the turpentine. This I found removed the eruption so rapidly that when a severe case of general psoriasis presented itself I resolved to compare the turpentine with chrysophanic acid by applying them upon opposite sides of the body. The result—namely, that the eruption was simultaneously removed from both sides, and from which I inferred that the two drugs were of equal value, at least in this case—I demonstrated at the Medical Society, and it has evoked much correspondence in your columns. A "Glasgow Student" suggests that the acid alone was the efficacious agent, because Dr. Charteris wrapped up one

limb in cotton-wool and anointed the other with chrysophanic acid, and both got well together. The experiment is suggestive, but not conclusive, for wrapping the limb up in wool and confining thus the perspiration is in itself a treatment, while the theory is effectually disposed of by the fact that turpentine when used alone suffices for the rapid removal of the eruption, and I have used it in many cases since the one shown at the Society; further, that when tar or other remedies of acknowledged inferiority are tested comparatively with chrysophanic acid, both sides do not get well simultaneously. While turpentine is clean and cheap, its main drawback is the odour. This may to some extent be covered with oil of lavender; still it is a disadvantage, and must be balanced against the dyeing and erythema-producing qualities of chrysophanic acid. I am not, however, anxious to vaunt turpentine as a new specific for psoriasis, but rather to point out that by intelligent research we may hope to attain to the ultimate aim of treatment represented by the motto "Cito, tuto, et jucunde." I have not gone into the management of psoriasis by internal means. To remove the eruption is one thing, but to prevent or postpone its return is only to be effected by careful hygienic and medicinal treatment adapted to each case, the success of which depends upon the judgment of the physician, seconded by the patient's care and ability to carry out his directions.—*Lancet, May* 7, 1881, *p.* 770.

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## 63.—CASES FROM THE SKIN DEPARTMENT OF CHARING CROSS HOSPITAL.

(Under the Care of Dr. A. Sangster.)

*Ulcer of Nineteen Years' Standing cured by Martin's Rubber Bandage.*—E. H. E., aged thirty-six, a baker by occupation. The patient, thin and delicate-looking, was at one time laid up with abscesses in connexion with hip joint disease. Nineteen years ago he met with an accident, grazing his shin. An ulcer formed, which never healed, but steadily increased in size. Many different ointments have been tried; some did trifling good for a time. Rest always did good; but unfortunately the patient's occupation obliged him to stand the greater part of the day. Always weak and poorly; frequently awake all night with pain. Appetite bad.

On June 30, 1880, he presented himself with a shallow thin-edged ulcer, involving the inner and posterior aspects of the right leg. The ulcer measured nearly five inches in length, by four inches in breadth; its granulations were pale and weak, and discharged a thin sero-pus. There were a few large veins about the leg and foot. No diffuse congestion, no eczema. The patient was ordered Martin's rubber bandage (size 1 A), being fully instructed how to use and apply it. The bandage to be

worn during the day. A mild mercurial ointment (hyd. oxid. rub. gr. vi. ad. ℥j.) to be applied at night; no medicine.

The ulcer healed steadily under this treatment up to a certain point, and, five months after taking to the bandage, it was reduced to an elongated patch of healthy granulations, about three inches long by half an inch broad, exactly over the inner border of the tibia. In this condition it had remained for some time. The arrest in the healing process seemed to be due to the effect of the counter-pressure of the edge of the tibia against the bandage, which, in accordance with Martin's directions, had as yet been applied without any intervening dressing. He was ordered to discontinue the bandage for a few days, resting the leg up continually and applying a strong lead lotion. On getting about again, he was advised to place a thick piece of lint over the sore before applying the bandage. According to the patient's statement, the ulcer healed entirely in about fourteen days after this plan was adopted. He was seen about two months ago greatly improved in general health, and the scar quite sound. The rubber bandage is still worn, and appears to be in as good condition as when first applied.

*Acute Urticaria "ab Ingestis."*—W. F., out-patient. Two days ago he ate a "faggot" (pieces of the viscera of animals, tied up in small bundles, and sold to the poor); soon afterwards was seized with vomiting and purging; the next day pain in the abdomen and loss of appetite; towards evening, began to itch on the forearms and legs; this morning the body was covered with eruption. He came with well-marked urticaria, especially affecting the elbows, shoulders, loins, scapular region, and garter positions; other regions affected, including the face, but in a less marked degree. On scratching the unaffected skin with the finger-nail, the part became hyperæmic and the hair-follicles prominent; but the characteristic wheals were not readily produced.

The case was one of ordinary acute urticaria "*ab ingestis.*" The only point of interest (one easily anticipated) was the tendency of the eruption to be most marked in those positions subjected to pressure or friction of clothes, etc.

*Abortive Herpes Zoster with "Factitious" Urticaria.*—H. D., aged thirty-eight, out-patient, attending under the late Dr. Irving. A red patch, very tender to the touch, appeared on chest-wall five or six days ago. This subsequently became the seat of a few small vesicles, which soon dried up. Another red patch made its appearance in the neighbourhood; no vesicles developed on it. The case was one of herpes zoster, tending to abort in its usual course. The patient presented the phenomenon of the so-called "factitious" urticaria; that is to say, his skin rose up in wheals from the most trifling irritation—once

passing the finger-nail along the surface was sufficient to raise a well-marked wheal. The same effect could be produced all over the body. He had never noticed anything like it until his present attack. The sequel of this case is not known.

*Persistent Attacks of Urticaria.*—E. B., aged sixteen, female. For the last ten years it has been noticed by the patient's mother that trifling mechanical irritation causes the skin to rise up in wheals; this was not remarked during infancy. No medicines or food cause the wheals to appear, nor do they ever come spontaneously. After drawing a blunt-pointed pencil (using moderate pressure) across the skin once, within two minutes there appeared a hyperæmic surface, extending more than half an inch on either side of the pencil-mark, which became the seat of an elongated pale wheal. An ordinary clinical thermometer, after being held against the normal skin for some time, until it ceased to rise, at once went up 3° on being held against the hyperæmic surface. There was no other abnormal condition of the skin present. The extremely irritable condition of the vaso-motor system, giving rise to the ready production of wheals from slight mechanical irritation, seems to be present in some individuals during the whole or a considerable part of a lifetime. It may be supposed that these extreme degrees of irritability of the vaso-motor system (and the degree must vary in each individual) play an important part in the sum of causation of skin affections. The condition giving rise to "factitious" urticaria is undoubtedly, in some instances, temporarily induced by causes which give rise to scratching. Dr. Liveing notices this. He says:—"Urticaria is extremely liable to complicate other irritable affections of the skin, such as scabies and phthiriasis." Dr. Sangster states that he has at first mistaken both these affections for simple uncomplicated urticaria, when the original disease has been ill-marked. In these conditions the extreme irritability of the vaso-motor system is probably due to exhaustion—the system is exhausted by continued stimulation, and therefore unduly mobile. It would be interesting to know if in any of these cases the urticaria persisted and became chronic after the removal of the original cause. In this connexion there are some facts, as regards the persistence of itching conditions of skin after scabies, which are suggestive.—*Medical Times and Gazette, June* 25, 1881, *p.* 701.

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## 64.—ON THE TREATMENT OF IMPETIGO LARVALIS BY POWDER OF IODOFORM.

By Balmanno Squire, M.B.Lond., Surgeon to the British Hospital for Diseases of the Skin.

Although iodoform has long been used with advantage in the

treatment of ulcers of various kinds—more especially syphilitic ulcers—I am not aware that it has been employed in any other kind of chronic skin-disease. The idea, however, happened to occur to me to employ it in impetigo larvalis; by which name I mean the mattery yellow-scabbed patches which occur on the faces of children and young adults. I was led to this idea by noting that the raw surfaces concealed by the scabs of impetigo have, although they are not ulcers, certain points in common with that class of ulcers which iodoform is specially successful in healing; namely, that they present a sodden false-membrane-like surface, which discharges copiously a milky pus, and that this surface has to be succeeded by a florid clean raw-beef-like surface before healing. My experiments have been conducted by removing the scabs and drying the sores with rags, and then dusting them over with a mixture of iodoform (in very fine powder) and of starch-powder in equal parts; and then, as the surface improves, I use iodoform powder undiluted. Very rapid improvement takes place under this treatment. The mere dusting over of the raw surfaces with the powder does not of itself suffice; since, if that alone be done, the surface speedily dries up again: that is to say, a thin hard dry scab is immediately formed, and this cracks, and so produces an uncomfortable tense condition of the surface, which is not only extremely irksome to the patient, but also highly unfavourable to rapid healing. I accordingly, in my earlier experiments, coated the powdered-over surface with a film of almond oil, laid lightly on with a camel-hair brush; but this plan, which succeeds very well in the case of ulcers, does not agree equally well with the excoriations of impetigo. What I find to agree very much better than the oil, is a film of glycerine, under which healing takes place much more rapidly. The conditions that have to be observed are these. 1. The scabs are to be softened by bathing them with warm soap and water, and then completely detached and removed, and thereupon the raw surface is to be gently dabbed dry. 2. The iodoform is to be in very fine powder, and freely dusted on. 3. A layer of glycerine is to be lightly laid over it. 4. The process should be repeated, if possible, every two hours by the patient himself; or, if a child, by its nurse. Under these conditions the disease —in many instances, within a day or two—exhibits a very remarkable improvement, and speedily becomes healed. A moderate dilution of the iodoform, with starch-powder, will render it quite a comfortable application in cases where it would otherwise cause irritation. — *British Medical Journal*, *May* 14, 1881, *p.* 767.

## 65.—ON THE USES OF IODOFORM IN ULCERATED, ERODED, GRANULATED, AND ABRADED SURFACES.

Dr. H. C. Howard contributes the following to the Chicago Medical Review:—The value of iodoform as a topical application has been before the profession for a considerable time, but I am convinced that it is not even yet appreciated by the majority, who have a rather indefinite idea that it is useful, and a very imperfect notion of the extent and scope of its usefulness. My own experience with this agent has been so satisfactory that I have come gradually to look upon it as the very best at our command for the healing of ulcerated, eroded, granulated, and abraded surfaces, which have for any reason too little inclination to take on healthy action, and which therefore require some alterative or stimulative impetus. I shall therefore designate in a few words some of the conditions in which I have found it useful.

*Chancre and Chancroid.*—Take iodoform one hundred parts, sugar of milk two hundred parts, thymol one part. Let the above be thoroughly mixed and reduced to an impalpable powder. The glans and prepuce must be thoroughly clean and dry, Then pack the ulcerated surfaces full of this powder, dust it over the surrounding parts, and secure it with a light bandage. Repeat the application as often as the parts become moist from new discharges. Ordinarily, about three applications will be required every day for the first two or three days, then as healing continues they may be repeated less frequently. A fair trial of this method will convince anyone of its superiority.

*Herpes Circinatus, Herpes Zoster, and Herpes of the Prepuce.*—Dissolve one dram of iodoform in one half ounce of the oil of eucalyptus, and paint the diseased surface with this solution. Two or three applications will usually effect a cure.

*Granulated Lids.*—Apply iodoform and sugar of milk, one part to five parts, directly to the everted lids with a soft brush. This occasions no smarting or pain, and often cures cases of months' standing in two or three weeks. Thymol should not be used in these cases, as it irritates and produces pain.

*Granular Pharyngitis.*—The same powder as indicated for chancre and chancroid may here be employed with an insufflator, thoroughly, at bedtime. The most obstinate cases will often yield promptly to this course.

*Chronic Ulcers of the Leg, Cracked Nipples, and all kinds of Indolent Ulcers with Raised Edges.*—Prepare an ointment containing one half dram of iodoform in an ounce of cosmoline, and apply frequently after having previously thoroughly cleansed the parts. The well-known and popular addition of the balsam Peru to this ointment masks the odour and adds to its value. I would add that the above is an auxiliary, not a substitute,

for the ordinary methods of applying pressure, such as strapping and bandaging, which should not be omitted.

*Uterine Catarrh.*—For uterine catarrh, or, as it is improperly called, endometritis—I refer to those cases in which there is congestion, and a consequent discharge, with some enlargement, and an erosion extending up into the canal—I employ a suppository, which is made and applied in the following manner:—Mix one half dram of finely-powdered iodoform with one ounce of the butter of cocoa. This may be kept in a shallow ointment-jar. I have a thin silver tube about one-fifth inch in diameter, with a closely-fitting piston. This tube is about eight inches long. When a suppository is needed I retract the plunger or piston to a point from the distal extremity of the tube corresponding to the length of the required suppository. Then fill the lower end of the tube by plunging it again and again forcibly into the jar containing the material for the suppository, and packing it solid by downward pressure of the piston. Then I apply the suppository by passing the end of the tube into the cervical canal, and force it out by pushing in the piston. The suppository will then be in the desired place. Five grams of the iodoform may be used at a time. Unlike the gelatine pencils of iodoform, which are so widely advertised, this melts and takes effect at once, and causes no pain.

*Fissure of the Female Urethra.*—This troublesome and intractable ailment yields promptly to the use of the same suppository which I have advised for uterine catarrh. Their use is commonly followed by the disappearance of those symptoms which are always associated with fissure of the urethra, and which so often lead to the false diagnosis of cystitis.

*Gonorrhœa in the Male.*—The same suppository, made in the same manner, and applied with the same instrument, may here be advantageously employed, care being taken to pass the suppository above the inflamed part. This treatment of gonorrhœa I have used for nearly two years, and I can testify to its great efficacy. It is a suitable substitute for injections, and is more sure in its effects. The application should always be made by the doctor, when possible. I have been pleased to see that Mr. W. Watson Cheyne, in a late number of the British Medical Journal, contributes a very definite testimonial to the value of urethral suppositories, or pencils, in the antiseptic treatment of gonorrhœa. I would, however, give the preference to the method of preparation and application which I have here described, as being simpler and perhaps more effectual than his. It must be remembered that the popular addition of balsam Peru in these suppositories is objectionable, by reason of its irritating qualities.—(Amer. Practitioner, Dec. 1880.)—*Dublin Journal of Med. Science, June* 1881, *p.* 537.

# MIDWIFERY,

## AND THE DISEASES OF WOMEN AND CHILDREN.

### 66.--ON CHRONIC INVERSION OF THE WOMB AND ITS TREATMENT.

By Angus Macdonald, M.D., Physician to, and Clinical Lecturer on Diseases of Women in, the Royal Infirmary, Edinburgh.

[Dr. Macdonald, after relating two cases of chronic inversion of the uterus, proceeds to remark on its causation, symptoms, diagnosis, and treatment as follows.]

*Causation.*—It is usually an accident occurring at delivery, as in the two cases I have recorded. When this happens, as pointed out by Dr. J. M. Duncan, there are at least four possible ways in which it may occur. Undoubtedly, in relation to its causation, the uterus may be passive, or it may be active; that is to say, the uterus may be in a condition of collapse, or may be actively contracted during the descent.

1st. The non-contracted uterus may tumble out of its own accord in obedience to gravitation or bearing-down effort. This forms what is called the spontaneous passive variety.

2nd. The non-contracted uterus may be pulled out by nurse or doctor in the removal of the placenta, or in consequence of too short a cord, or otherwise. This constitutes the artificial passive variety.

3rd. The uterus, all except the area on which the placenta is situated or a fibroid is attached, may be powerfully contracted, and thus the organ may turn itself outside in by a wave of contraction passing along its body. This forms the spontaneous active variety.

4th. The accoucheur or nurse, by traction on the placental area, may invaginate it and begin the inversion. The uterus, treating the inverted placental area and placenta as a foreign body, contracts firmly round its base; that wave passes rapidly over the whole uterus until the whole organ is inverted. This forms the artificial active variety.

But in addition to cases arising at term, a certain proportion of others follow abortion, whilst some originate in the unimpregnated condition through the influence of polypi or other tumours. With such cases, however, I have no personal acquaintance, and therefore do not stay to consider them.

*The Symptoms* of chronic inversion of the uterus are various.

The principal are, profuse menorrhagia, pain, and down-dragging. When there is not a profuse discharge of blood, the patient is usually tormented with a sero-sanguineous discharge from the vagina which continuously saps her strength. As a result of the menorrhagia and leucorrhœa, the patient gradually becomes pale, anæmic, and weak, with a distinct tendency to œdema of the more dependent parts. Life is a burden, duty becomes a toil, and the woman, in short, is supremely miserable. In some cases the uterus comes to protrude outside the woman's body, and the irritation to it thereby occasioned adds greatly to her other misfortunes. In most cases, on the first oncome of the accident, there is much pain, alarming hemorrhage, and shock. In the cases I record these symptoms, though not entirely, are certainly largely absent.

*Diagnosis.*—No careful gynecologist would risk a diagnosis on symptoms alone. A physical examination is necessary. In this connection it is important to point out, with all the emphasis one can summon, the danger of confounding this lesion with intra-uterine polypus. This has been frequently done, and by practitioners of wide experience and great ability. Indeed, I have never yet shown a case of inversion for the first time to any gentleman who did not think it must be a polypus. That being so, it is of importance to insist, "line upon line, precept upon precept," that this danger has to be feared and obviated. It is not difficult to establish a correct diagnosis; but it needs care and attention. The means of arriving at certainty have been again and again pointed out; still I must be pardoned for recapitulating them.

First, The vagina is occupied by a rounded or pear-shaped body about 2½ inches in length, which, when the patient is laid on her back, does not protrude beyond the vulva, but is completely contained within the vagina. This rounded or elongated body projects through the cervix, which is *widely dilated*, like an intra-uterine polypus. The tumour, when touched, bleeds very readily, and, I should point out also, is more or less sensitive when touched or pricked, whilst a polypus is not. Frequently manipulation produces contraction in the uterus, which makes it rounder and harder. Then the finger or sound can get to the reflexion of the body of the uterus from the upper end of the cervix all round, and find the way impeded by that reflexion, so that a sound can nowhere pass over an inch. If at any point the sound passes 2½ inches or more, the conclusion is tolerably certain that we have got to deal with a polypus.

By double manipulation, with the aid of chloroform and of sound in the bladder if necessary, the uterus may be proved to be absent from its normal situation, as the finger in the posterior vaginal arch or in the rectum may be usually brought to meet

that in the abdomen over the base of the tumour, bringing out in that way that the uterus is absent and that the upper part of the tumour is cup-shaped. If need be, this manœuvre may be aided by dragging down the uterus with the hand or with the assistance of a volsella, but the hand is usually sufficient for this purpose. When this is done it is easy to make out the cup-shaped upper part of the tumour and the absence of the uterus from its proper situation. The finger passed into the rectum now enters easily into the cup at the upper end of the tumour.

A good deal of the tendency to error in diagnosis as well as in treatment of this lesion depends upon the persistence of erroneous views as to the ordinary condition of the cervix and the site of stricture in regard to this lesion.

It is constantly *assumed* by the inexperienced in these matters that the cervix is inverted along with the rest of the uterus; and accordingly, when they find a gaping cervix surrounding the base of an ovoid tumour which occupies the upper part of the vagina and projects from the gaping cervix, they at once jump to the conclusion that this must be an intra-uterine polypus. Now, it ought to be known that the cervix uteri seldom or never partakes in the inversion of the organ. The body and fundus are inverted, but the inversion ceases at the inner os. The cervix maintains its normal position, is wide and patulous, so that there is seldom any difficulty in crowding the entire inverted body and fundus into its cavity so that the fundus is above the outer os.

The greatest difficulty is experienced in dilating that part of the body which would naturally have been immediately above the inner os, but which in this case is, of course, situated immediately below it. It is here that that stricture takes place, and it is here that the great difficulty of reposition is experienced. It is easy enough to invert the cervix by dragging down the uterus, when the whole organ becomes completely inverted; but when the uterus is pushed back, it is found that the cervix at once becomes reinverted.

It is lamentable to find how, even in the best and latest text-books, such as Courty's, this old error in regard to the cervix is retained. At page 727 of the last edition of his Traité Pratique des Maladies de l'Uterus, &c., Courty says, "Dans l'inversion complète et chronique, les vrais obstacles à la reduction sont, la contraction et la dureté du tissu utérin, la constriction et la rigidité du col, la mobilité de l'utérus, et surtout le défaut de fixité du col."

The true state of matters is ably pointed out by Dr. J. M. Duncan in his paper on "Inversion of the uterus," Edinburgh Medical Journal, page 769, March 1877. In all the cases observed by me, certainly there was no stricture in any part of

the cervix, which was large and patulous throughout. The stricture was always experienced in that part of the body immediately beyond the cervix, and seemed due to the advance of the normal involution. All talk, therefore, of facilitating reduction by notching the cervix is wrong and misleading.

*Prognosis.*—The anticipation of health with chronic inversion is bad in the extreme. The patient is rendered sterile, she is unable to perform her conjugal duties, she is constantly tormented by down-bearing pains, is perpetually exposed to attacks of menorrhagia, which alternate with profuse thin sero-sanguineous discharges.

In the first of my two cases the hemorrhage was so intense at the menstruation immediately before the operation that the patient must have succumbed to one or two similar attacks if she had not been relieved. The patient, before I saw her first was reduced very greatly in strength through the resulting anæmia.

The second case was that of a more vigorous woman. The bleeding in her case was not so severe, yet sufficient to maintain her in a condition of great anæmia, and the pain and distress were so great as to make her anxious to submit to any proposal for relief of her sufferings. With the menopause relief from hemorrhage comes usually, although, according to Courty, not always.

A few cases of spontaneous reinversion of the uterus are recorded. One undoubted case is given by Spiegelberg (Archiv für Gynäkologie, Bd. v. S. 118), after it had been down three months. Several cases are contained in Crosse's great work. Others are mentioned by Meigs, Halch, Rendershaw, in which inversions which had lasted from a few hours to many months spontaneously rectified themselves. There is considerable looseness of statement in the cases, however, with the exception of that of Thatcher and Barre, which lead one to be very cautious in accepting the conclusions arrived at, although, from the nature of the case, they cannot be regarded as incredible. This result is however, so extremely rare as to be entirely beyond consideration in the matter of prognosis.

It is strange that seldom or never any portion of bowel is met with in the cavity of the inverted uterus, and that adhesions between the opposing peritoneal surfaces are so uncommon. It will be noticed that notwithstanding the frequent attempts at reposition to which Mrs. B.'s uterus was subjected, there was not a trace of adhesion between the opposing peritoneal surfaces, nor any trace of plastic lymph thrown out upon them. This is pointed out by Spiegelberg in the account of two cases of amputation by elastic ligature lately recorded by him. Even after this slow method of amputation the peritoneum

remained free from inflammatory action. The fear of strangulation of intestine or the fear of injury to bowel in a case of amputation is, therefore, slight in the extreme.

The results that may be expected from treatment are, on the whole, good, but not nearly so good as some authors, such as Emmett, would lead us to expect. It is perfectly comical to notice this author in his work, pages 435—438, asserting magniloquently that no chronic inversion ought to be given up, when of four cases recorded by him he himself only managed to reduce one. It will be noticed that one was reduced by Dr. Thomas, another by Dr. Nöggerath, and a third he failed to reduce, and contented himself with sewing it into the cervical cavity and leaving it there.

I have examined the literature of attempted replacements of the inverted uterus with some care. I need not give the names, as that would lead us too far; but the cases are collected from all sources I could find. They include the practice of continental, American, and British gynecologists, so far as one could gather from reports in journals.

The cases of chronic inversion so collected amount to 66 in number. Of these 66 cases 22 were failures,—that is, they either could not be reduced or the patients died a few hours or days subsequently to the reduction,—and 44 were successes. There were thus 33·3 per cent. of failures and 66·6 per cent of successes.

I have purposely avoided saying anything regarding the results of acute inversion. That is no part of my present theme. It may be mentioned in passing that the immediate risks from shock, bleeding, gangrene, etc., are very great indeed, and lead, as pointed out by Crosse and others, to a fearful mortality. Thus Crosse states that of 109 patients whose histories he was able to gather, afflicted with inversion, 72 died a few hours after delivery, 8 before the end of a week, and six within a month.

*Treatment.*—When we proceed to consider this head we encounter no end of proposals. But they are all capable of being grouped under two heads:—

1. Methods of replacement.
2. Methods of amputation.

For long it was deemed impossible to replace a chronically inverted uterus by any means, and such women as became victims of the accident at delivery and outlived its direct consequences without the uterus being immediately replaced were abandoned to their fate.

Dr. White of Buffalo (American Journal of Medical Sciences, vol. xxxvi., 1858, p. 13), by the record of his experience in a case in which the uterus had been down seven days, and another

in which the uterus had been down for five months, was perhaps the first to give a decided impulse in the direction of attempting the systematical reduction of the chronically inverted uterus. One or two others in Europe had succeeded in reducing chronic inversion before White, for Valentin (Revue Médicale Chirurgicale, 1847) records a case successfully reduced by him after sixteen months; Bassier of Lyons (Archives Générales de Médecine, 1852) another after eighteen months; and Canney of Bishop Auckland, England (Medical Times, vol. ii., 1852), one of five months; and it would appear that in America even White was preceded by Quackenbusch. Still the record of White's cases and method appears to have been the starting-point in this mode of treatment, and to have encouraged gynæcologists to persist much more than they had been wont in efforts at forcible reduction in chronic cases.

Since that time numerous methods had been proposed for fixing the uterus and directing the force for reposition. Many of these methods scarcely deserve the name of special methods. The essentials of a good method are one that is safe, that gives proper support to the cervix and pelvic attachments of the uterus, and that tends to dilate the constricted part, viz., that portion of the uterine body abutting upon the inner os. The one hand of the operator in the vagina, pushing up the fundus, and the other hand steadying the cervix and endeavouring to dilate as far as possible the cup-shaped stricture formed by the base of the tumour, is perhaps the safest, if not also the most successful method. It needs perseverance and patience. An air pessary introduced into the vagina, and then dilated and left there, is a good preparation, and makes the vagina roomy, thus facilitating the manipulations of the hand which is pressing up. The want of room compels it always to act at great mechanical disadvantage. Only a small amount of the operator's force is utilized. Besides, the hand is constantly getting cramped in its constrained position, which still further tends to impede progress. This plan was originated by Dr. Tyler Smith, and in his case was successful in reducing a case of twelve years' standing. It has been also successful in some other cases, such as those of Teale, West, Backenthal, Courty, Schrœder, Grassi, and A. C. Tyler. But it is not without danger. In one case recorded by West it led to fatal peritonitis.

I tried it thoroughly in both the cases I have here recorded, and in another which I have as yet failed to reduce. But it had no appreciable effect as a repositor. Latterly I merely employed it to give space in the vagina as a preparation for operation. It has one unfortunate peculiarity—the patients simply abhor it. One after another have told me they would submit to anything rather than the bag because the distress it occasioned was all but unbearable.

Courty lays much stress upon a method adopted by him in a successful case. This consisted in pulling the uterus well down outside the vulva, and getting the fingers hooked through the rectum into the cup-shaped hollow at its base. By this means he was able to maintain by the rectal hand good counter-extension, whilst the rectal finger favoured dilatation of the stricture. I have tried it often, and cannot see the advantage in it which its author claims. Nöggerath of New York made the suggestion of endeavouring to reinvert by indenting the uterus at the opening of one or other of the Fallopian tubes, where, according to the conical development of the muscular fibre, it might be expected to be more easily invaginated. It appears an excellent suggestion, and, so far as I can make out, is likely to be very valuable in cases immediately after delivery, but it would appear of little advantage in chronic cases.

Cup-shaped repositors to aid in inversion are very numerous, but they all need care in their application. I completed the reduction of my first one with this instrument. It is simply a straight rod of wood, the ends of which are expanded into two cups of different sizes. The larger is intended to aid in the inversion until the fundus is about as high as the inner os, and the smaller one is meant to complete the operation, as it can pass through the inner os. It is not to be forgotten that such an instrument may be dangerous, even though we had not the record of my second case to enforce that lesson. White originally used a rectal bougie to aid in pushing up the fundus. A repositor with a cup-shaped extremity and a pelvic curve, successfully applied to the inverted organ by Dr. Aveling by means of elastic pressure, is figured in volume xx., page 126, of Transactions of the London Obstetrical Society. Repositors have been made to be applied by pressure communicated from the operator's breast, with spiral stems, so as to avoid putting forth undue force.

The necessity for using first a larger and then a smaller cup has been attempted to be obviated by having a movable bottom in the repositor, which at the same time is provided with an apparatus for exerting counter-extension. This repositor is applied so that the fundus uteri is received into the cup, whilst the other end is applied to the upper end of the uterus, and then the larger cup is made by suitable mechanical screw arrangements to push up the fundus as far as it can. After that object is affected, while it maintains its position, the movable bottom is propelled onwards to complete the reduction. This certainly is an ingenious method, and is the offspring of Dr. Byrne of Brooklyn (New York Medical Journal, Oct. 1878), but to any one who has had experience of such matters many practical difficulties as to application and otherwise suggest

themselves. This instrument is reported as having been successful in two cases.

Mr. Lawson Tait (Obstetrical Journal, vol. vi., p. 555) proposed a series of repositors. His idea is a good one. It is to apply cups of successively diminishing size to the fundus uteri, in order to tire out the muscular resistance by small but continuous amounts of elastic pressure. I procured them, and tried them faithfully in two cases. The cup of the stem is applied over the fundus uteri, there are holes in the stems through which elastic bands can pass, and these are attached before and behind to a belt passed round the woman's belly. They are easily applied, they are well borne, and they are theoretically correct. But practically, even where used with rubber bands much stronger than those which Mr. Lawson Tait recommends, they are positively useless. In my experience they did no good, although I must in justice state, also, they did no harm. I was the more disappointed in this inasmuch as I undertook their application with high hopes, as the theory is so excellent. Mr. Tait found his repositors successful in one case of ten weeks' standing. Dr. Matthews Duncan, in one case, was bold enough to incise longitudinally the muscular tissues of the upper part of the body of the uterus, which is the part that gives, as I have already explained, the greatest resistance. This patient did well, and to my knowledge, has since been delivered safely.

Dr. Barnes, apparently believing that he incised the cervix, records a successful case which was essentially the same, to my reading. It would appear that Dr. Barnes began his incision in the muscular tissue of the cervix, but that as he attempted to invert the uterus the muscular tissue tore into the lower part of the body, and that he was thus successful. The same is true of the case of Dr. Wilson, Greenock (Lancet, June 23, 1877).

I have thus drawn attention to the leading adjuncts to the forcible reposition of the uterus. I am fully persuaded that the best method of operating is :—

1st. To prepare the parts well with the air pessary, but not to continue that too long, on account of the danger of irritation it may set up, and the pain and distress it occasions. This may succeed alone—it has on many occasions.

2nd. But if this method fails, after having the patient well anæsthetized, efforts should be made, prolonged and steady, by manual pressure from the vagina and counter-pressure from the abdomen, to reduce the organ. The counter-pressure may be made by an assistant, who may also endeavour to flatten out the cup by pressing on the outer sides of it. The reducing pressure, it appears to me, should be made on the fundus, after it has been well squeezed, so as to force out as much as possible

of the blood it contains, to reduce its bulk as far as possible. These efforts are to be prolonged until the uterus is reduced or until the patient's condition compels us to desist. It is perfectly astonishing how little reaction usually follows such an operation. If the uterus stretches and the fundus is easily indented, the case may be looked upon as favourable.

3rd. A repositor may be used cautiously to complete the operation. It enables the operator to economize his force, as his hand cannot be applied advantageously in a mechanical point of view. But much care must be employed to avoid exerting too much force, and to make certain that the counter-pressure is perfect. Even under deep anæsthesia, counter-pressure is much more easily effected in some cases than in others.

In the second case recorded by me I cannot help feeling that too great force exerted through the repositor, with perhaps imperfect counter-pressure, may have led to the rupture. Still, the longitudinal direction of the tear being in line with, and not at right angles to, the direction of pressure, would rather indicate that the tear was due, partly at least, to a natural deficiency of tissue. But my second case bears the strongest evidence in support of the contention that all inversions are not capable of forcible reposition.

Any one who looks at the thickness of the chronically inflamed fundus and examines the friability of its tissues will, I feel assured, at once allow that no amount of force would have pushed this mass safely through the constricted body. In the act of reinversion it seems to me that the fundus must have torn asunder, even had we been able to pass it through the lower part of the body.

In those cases in which, after a fair amount of well-directed effort has been employed with hand or repositor or both, and the only result is flattening of the base of the tumour without appreciable ascent of it, I am of opinion that the operator is bound to consider very carefully how long he should continue in his efforts at forcible reduction.

*Amputation of the Uterus.*—In case of failure to replace inverted uterus, if the symptoms dependent upon the lesion are of a threatening character, the only means to secure permanent relief is amputation of the organ. This procedure doubtless mutilates the patient, and is in itself fraught with considerable risk. But we have to bear in mind that chronic inversion of the uterus, as a rule, gives rise to much annoyance, and it becomes a continual source of distress, whilst the accompanying hemorrhage may at any time jeopardize the patient's existence. In those cases, however, which give rise to only a moderate amount of bleeding and little inconvenience otherwise, it is not

advisable to recommend amputation. Measures of a palliative nature should be employed, particularly rest at the periods, with ergot and astringent medicines, such as gallic acid. The leucorrhœa and uterine congestion are largely relieved by the hot douche. Iron in some form, as well as other tonics, are to be given between the periods.

The results of amputation are not so unsatisfactory as is usually held, however. At one time it was deemed an operation that could not be undertaken on any consideration. The record of reported cases does not show so specially bad statistics. Duncan and West, at p. 231, give a table of amputations of the uterus, of which 42 recovered, 15 died, whilst in two the operation had to be abandoned. This enumeration, as is evident from the accompanying bibliographical list, does not include a great many important recent cases, the bulk of which were successful. When those cases recently reported in the medical journals are added to the statistics of West and Duncan we find 165 cases, of which 124 were successful and 41 ended fatally from amputation, giving a percentage of 33·06 failures.

The most imminent danger arises from the risk of the cervix becoming spontaneously reinverted. It will be recollected that I insisted in this paper that in ordinary circumstances the cervix uteri is not inverted in a case of chronic inversion of body and fundus. There is thus a marked tendency in this part to retain its natural position, even if the rest of the uterus is inverted.

At the moment of amputation the cervix is inverted along with the body and fundus as a result of the necessary downwards traction exerted upon the uterus to facilitate the operation. When the organ is amputated, the inverted cervix is at liberty to obey its own tendencies, and so is very apt to reinvert itself. But in so doing it carries with it the cut section into the abdominal cavity, and if that section is the site of any putrescent materials or sloughs, we are exceedingly apt to have peritonitis septica set up. It is important, then, if we cannot prevent reinversion of the stump, to take measures for draining its cavity, aud also to adopt in amputation such a method as shall be least likely to carry septic matters into the peritoneal cavity.

But the next great danger is bleeding. That, I am satisfied, can be perfectly well guarded against with a little care in amputation. While I regard the ecraseur as sufficient for the arrest of the bleeding in the muscular wall, two arteries in relation to the two broad ligaments ought to be carefully secured, as also the ligaments themselves, by some such method as I adopted in my second case. I feel very strongly convinced that the use of the galvano-caustic wire or the Paquelin's cautery, or even the ligature, as they produce a great deal of

dead tissue, add greatly to the risk of septic infection through inversion of the cervix, and that some modification of the knife and ecraseur will be found ultimately the safest method of procedure. The danger of including a portion of intestine in the section is exceedingly slight, inasmuch as in cases of chronic inversion it is extremely rare to find any portion of the intestine in the cup of the uterus. I would therefore be inclined to recommend the use of the ecraseur down to the peritoneal coat. Then I should open the peritoneal sac and complete the amputation by scissors, taking care that the Fallopian tube is prevented from retracting, and the large vessels in relation to it prevented from bleeding, by firmly twisting a wire noose over it, as in my second case.

But many methods are used, and with varying success. M. Courty and Spiegelberg have both used the elastic ligature in two cases with success. The uterus falls off in the course of eight or ten days. M. Courty states also that one of his pupils successfully amputated a uterus by the same method. The galvano-caustic wire has also been used on various occasions. Spiegelberg, Veit, Nyrop have each used this plan. In the case of the latter the patient nearly lost her life from pelvic suppuration. Courty, after trial of this method, expresses himself as averse to it. Good success has followed the ecraseur alone, especially in the hands of Drs. Greenhalgh and Godson. An ordinary stout ligature to transfix the stump and tie it in two halves has also been frequently employed. The stump is so thick that it is difficult to make certain that hemorrhage shall be entirely absent, and, moreover, there is much tissue that is thereby killed, and great danger, therefore, of septic results in case the cervix becomes reinverted. Still we find some prefer one method, some another. The main points are, to avoid bleeding, to avoid entrance of putrescent matters into the peritoneum, and to disinfect thoroughly.

It is to be hoped that as we gain a better insight into the principles which regulate reposition of chronic inversion—and there must be some reason to explain why at one time a uterus is so easily reinverted compared with another—the necessity for amputation of the uterus will diminish more and more. It would almost appear from the history of repositions that the uterus passed through certain phases when it was very much more easily replaced than at other times. What these phases are, if they exist, and whether they have any relation to the menstrual period, is at present entirely unknown. Something must be discovered to explain how spontaneous reposition can occasionally occur in an organ that resists at another time the most vigorous efforts at forcible replacement. Then, again, we find a uterus that resisted hours of well-directed effort one day,

next day replaceable by the gentlest manipulation. On other occasions the history of a chronic reposition shows that next to no resistance was offered by the organ to reposition. If we expect ever to be able to explain these points, we need the histories of every case carefully noted, and every point about them, however trivial, thoroughly encogitated. But this is work still in the future. In the meantime I bid good-bye to the subject, simply stating that in cases of uterine amputation satisfactory results can never be expected except the strictest measures are adopted to disinfect the vagina and stump, and to maintain free exit of any septic matter that may result from reinversion of the cervix.—*Edinburgh Medical Journal, Sept.* 1881, *p.* 198.

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## 67.—THE RADICAL CURE OF PROLAPSUS OF THE UTERUS.

By J. Wallace, M.D. Edin., Physician to the Thornton Wards for Diseases of Women, Royal Infirmary, Liverpool.

All authorities during the present century have recognised that if the vagina could be sufficiently narrowed, the cure of prolapsus uteri would be the result. Hence, the late Dr. Hamilton tried to excite adhesive inflammation of the vaginal walls; and Cruveilhier applied caustics, escharotics and acids to the upper part of the vagina, so as to produce a cicatricial contraction of the tube, which would support the uterus. In my paper on Displacements of the Unimpregnated Uterus (vol. v. Liverpool Med. and Surg. Reports), I pointed out that in the early stages of procidentia, when the perineal support was not impaired, vaginal injections of the liquor ferri perchlor. fort. of the strength of one part to six or four, or even three, of water, would so contract the canal as to close it altogether, if the treatment were persistently carried out. One case thus so cured has never relapsed. Narrowing the vagina by the knife was proposed by Girardin in 1823, and was carried out by Ireland in Dublin, Marshall Hall, Fricke of Hamburg, Dieffenbach, Velpeau, Von Langenbeck and C. Braun, and more lately, and in a more complete form, by Baker Brown, Marion Sims, Emmet, Simon, Hegar, and others.

It would be impossible, in this short paper, for me to enter into any critical inquiry as to the advances made by these authorities in the methods of operating, or to endeavour to give to each his due meed of credit. Of one thing I am sure, that as a result of their work, we are now bolder in our practice and efforts to repair, and we know that plastic operations of a large and apparently serious extent are well tolerated by the vagina, and, so far as my present experience goes, are perfectly safe to the patient. In detailing the cases, I shall not call any of the

operations by the name of any authority, for they were all performed according to what seemed best for the requirements of each individual case. I am indebted to Dr. R. H. Jones, my recent house-surgeon, for the records from which I shall condense the following notes of the cases that came into hospital.

*Case* 1.—E. T., housewife, æt. 50, admitted June 17, 1880, into the Thornton Wards. She had suffered from complete procidentia uteri for eleven years. Perineum very short, affording little support to pelvic contents. On anterior surface of cervix uteri an ulcerated surface of size of a half-crown, caused by frictional irritation of parts, protruded beyond external genitals. The patient is incapacitated for her usual occupation, which necessitates constant erect position. July 2, 1880. The patient being under ether, the cervix uteri having been seized with a vulsellum, and fixed in position, the raw surface had its granulations shaved off with scalpel, and then a piece of vaginal mucous membrane of corresponding size was dissected off anteriorly, leaving a raw surface, which, when the uterus was reduced to its proper position, would be in apposition with that in the cervix uteri. The edges of these surfaces were then brought together with wire sutures, and the prolapsed uterus reduced. The deficiency of perineum was then remedied by removing a triangular piece of mucous membrane from the posterior part of the vagina and perineal vulvar orifice, and bringing the edges together by transverse vaginal and deep perineal sutures, the latter so looped round the former, that when they were tightened up, a firm wedge-shaped perineum was formed. Patient recovered without a bad symptom, and was discharged cured Aug. 4, 1880, able to walk with comfort, and freedom from pain. The patient was told to leave off wearing tight stays, to get an abdominal, or rather a pelvic, belt, arranged with cork, so as to complete the bony circle of the false pelvis, and thus keep off the superincumbent pressure of the intestines from the uterus, and to wear a vulvo-perineal pad. She called at the clinique, May 19, 1881. She had not carried out any of these instructions, but, on leaving the hospital, had returned to her occupation, and remained comfortable and well; she merely returned to get part of a wire suture removed. This was done, and it was seen that the cervix uteri was in the same position, fixed to the base of the bladder. The vagina, which on dismissal only admitted the finger at the ostium, was now pretty well dilated; the fundus uteri was lying backwards and pressing upon the perineum, and threatening to dilate it, but giving rise to no symptoms. She, however, would not promise to return to hospital, as she felt well. She was told again to wear a vulvo-perineal pad. In this case, it was pretty

evident the dilatation had been from without, and not primarily from within. In the next case a perfect result has followed the operation performed, the husband of the patient being dead.

*Case* 2.—B. W., æt. 62, monthly nurse, admitted June 5, 1880, suffering from complete procidentia uteri, causing great discomfort and difficulty in walking. This came on after delivery of first child, when aged twenty-six, about thirty-six years ago. She has tried all kinds of pessaries, and consulted over a dozen medical men. A plastic operation was performed by one, but failed. The patient being under ether, the cervix uteri was seized with a vulsellum, and the uterus and anterior vaginal wall put upon the stretch, and a piece of mucous membrane was then dissected off the whole of the anterior surfaces of both, extending from close to os uteri to about half an inch from the urethra. The edges were brought together with wire sutures, and the prolapsed uterus reduced. The perineum, which was very defective, was then remedied thus:—The large duckbill speculum being introduced anteriorly, and the patient still fixed in the lithotomy position, with the buttocks well raised, an A-shaped piece of mucous membrane, extending upwards from rectal orifice nearly 3 inches, was dissected off the posterior vaginal wall, and the operation of perinæorrhaphy completed, the edges being brought together by transverse vaginal and perineal wire sutures. Patient recovered without a bad symptom. Sutures removed in a fortnight, and she was discharged cured Aug. 10, 1880, the uterus being well kept in position. Returned again complaining of pain and weakness. A stitch was discovered and removed, and she was again discharged in a few days well. This patient called upon me about nine months after the date of operation, looking in perfect health, and with the report, that the cure was permanent. The vagina was still small, the perineum perfect, and no downward tendency whatever could be detected or felt by the patient, and, although the uterus was fixed to the base of the bladder, she had no urinary trouble. She can now undertake her duties with comfort.

*Case* 3.—A. E., housewife, æt. 54, admitted Aug. 8, 1880, suffering from complete procidentia uteri. Sept. 2. She was put under ether, in the lithotomy position, and the double operation of elytrorrhaphy and perinæorrhaphy performed, and the edges of the mucous membrane brought together carefully with wire sutures, just as in Case 2. Patient recovered without complication. Stitches removed Sept. 16. Discharged Sept. 27, the uterus being kept in position admirably, and the patient able to walk freely and without discomfort. Like the others, she was enjoined to wear the vulvo-perineal pad, to avoid tight

lacing, and to get the pelvic bandage. The results in this case were so satisfactory, that I am not at all surprised at her not having again presented herself at the Thornton Wards.

*Case* 4.—E. T., æt. 63, charwoman, admitted Aug. 9, 1880, for complete procidentia uteri. Sept. 22, under ether, in lithotomy position, operation was performed in usual manner, with this difference, that anteriorly the line of suture, instead of being antero-posterior, or, as in the first operation, transverse, was Y-shaped. The posterior operation of elytrorrhaphy was completed in the usual manner, great care being taken to pass the perineal sutures round the transverse vaginal, so as to secure a strong wedge-shaped perineum, when the parts were brought together with wire sutures. The patient recovered without complication. Sutures removed Oct. 20, and she was discharged Oct. 27, the uterus being well suspended in the upper part of the vagina, and the perineum firm and strong. She could walk well, and was free from pain and pelvic discomfort. This case marked an advance in the method of fixing or suspending the uterus, and so small was the vagina, and so firm the plastic results, with the small sessile uterus fixed into the upper and front part of the tube, that a permanent cure was to be expected.

*Case* 5.—L. G., æt. 37, housewife, admitted Oct. 11, 1880, suffering from everted lips of cervix uteri, extremely defective perineum, and prolapsus uteri. Patient was unable to stand or walk erect, and complained of severe pain in sacro-lumber region, and down front of thighs. Under ether, in lithotomy position, the duckbill speculum having been introduced, the edges of the everted lips of the cervix were pared, and brought together with two sutures on each side of os uteri. A triangular flap of mucous membrane was then removed from the posterior vaginal wall, and perinæorrhaphy performed as in the others. Stitches removed Nov. 6, and patient discharged Nov. 29, able to walk fairly well, and free from all pelvic symptoms. In this case the procidentia was only in the first and second stages, and as there was no cystocele it was not deemed necessary to interfere with the anterior vaginal wall so as to fix the uterus and narrow the passage; the more so was this necessary when we consider her age and the possibility of her having children subsequently. She again appeared lately at the hospital for endometritis, and we were able to note that, with respect to the operation, it had been in every way a success.

*Case* 6.—Mrs. A., æt. 46. Nov. 2, 1880. A patient sent to me by Dr. Lambert of Birkenhead. Consulted me for complete procidentia uteri. Perineum ruptured close to sphincter ani. Nov. 4. The double operation was completed very thoroughly. Nov. 15. Sutures removed. The operation was successful. The

patient called upon me in April 1881. I found the uterus *in situ*, and the perineum intact. She wears a vulvo-perineal pad, and for four months after the operation avoided sexual congress. There can be no doubt this is a most important provision, as it permits the parts to become thoroughly consolidated. My friend Dr. Lambert tells me the cure is perfect.

*Case* 7.—W. F., æt. 41. Married. Public-house keeper. Admitted, Nov. 18, 1880, suffering from complete procidentia of a greatly hypertrophied uterus, with marked eversion of lips of cervix. Nov. 18. Under ether, in usual position, operation for everted lips of cervix was performed. The anterior elytrorrhaphy was then thoroughly completed, leaving the Y-shaped line of incision, when the sutures were all fixed and the mucous membrane brought together. This was considered to be sufficient for the present, and as much as the patient's strength could bear. After removal of the stitches on Nov. 10, the posterior elytrorrhaphy and perinæorrhaphy operations were completed. She made a good recovery, and was discharged Feb. 23, 1881. There was one drawback to this plan of dividing the operation into two stages, namely, that the uterus was not supported in its position by the posterior wall of the vagina and the new perineum, and, as a consequence, it was depressed, and caused such dragging upon the sutures that several of them gave way. The only advantages of doing the operation at two sittings are, to prevent excessive shock, and to facilitate the removal of the sutures. It is somewhat difficult to do so when the vagina has been so narrowed as only to permit of the passage of the finger, or the bi-valve anal speculum.

*Case* 8.—Mrs. H., a lady, æt. 35. Sept. 1, 1881. Came under my care suffering from down-bearing, pelvic discomfort, and digestive and circulatory reflex neuroses, and having a long history of uterine trouble, and failure of all treatment. On examination I found she had subinvolution of uterus, everted lacerated lips of cervix, procidentia in the second degree, and ruptured and relaxed perineum, with commencing rectocele. On Nov. 9, operation, under ether, was performed for eversion and laceration, and also perinæorrhaphy. The sutures were removed on Nov. 22. She made a perfect recovery, and now continues quite well; all her pelvic and uterine symptoms having been removed by the compound operation. In this case the vulvo-perineal pad and pelvic bandage were worn with very marked advantage. I examined her uterus, May 31, and found the cure permanent.

I shall now proceed to record the next case in such a systematic manner as to illustrate what I have now come to consider the most perfect method of performing the double operation.

*Case* 9.—Mrs. S., æt. 51, wife of a farmer, was sent to me by my friend Dr. Hugh Miller of Birkenhead, April 14, 1881. She has had falling of the womb for twenty years, and for some years it has been completely outside. She has irregular muco-sanguineous discharges, dragging pain in back and loins, frequent desire to micturate. Married twenty-seven years; had seven children, the youngest thirteen years old. First child was delivered by instruments. Perineum was torn in fifth labour completely. On examination, has complete procidentia uteri; os and lips granular, and bleeding on touch. Perineum torn close to anus.

April 19.—After preparatory treatment patient was etherised by Mr. Barron, and Drs. Jones and Lindsay acted as my assistants. The front elytrorrhaphy was thus carried out:—Grasping the prolapsed uterus, which had an ulceration of the lips the size of a florin, it was dragged sufficiently downwards so as to make the parts tense, the patient being placed in the lithotomy position. The primary incisions were then made, the bladder having been emptied and a sound passed into it to drag it away from the vagina, *vide* fig. 1, *a*, *a*, *a*, *a*. The most anterior was carried transversely, following the line of the rugæ of the vagina about half an inch from *u*, the orifice of the urethra, and two longitudinally backwards, in the form of a curve, more or less ovoid or circular, until they met about half an inch in front of *o*, the os tincæ. From this surface the mucous membrane was rapidly dissected off with a sharp scalpel, and but little hemorrhage follows, as is usual, if, among other preparatory measures, the hot vaginal douche has been administered for one hour immediately before the operation. Any large vessels can be picked up and ligatured with catgut as the operation proceeds. Pressure will stop oozing, and the closure by wire sutures effectually checks any hemorrhage that may persist in spite of these hæmostatics. There is little risk of opening the bladder, and if it bulges it must be held back by a stick sponge. The sutures were then introduced as follows, *vide* fig. 2, *b*, *b*, three or more, obliguely, so as to close each corner, and *c*, *c*, five or more, transversely, so as to close the lateral lines of incision. Sometimes one or more additional sutures have to be placed at *d*, so as to close completely the space where the stellate lines meet, as in fig. 3, where the parts have been carefully brought together to ensure com-

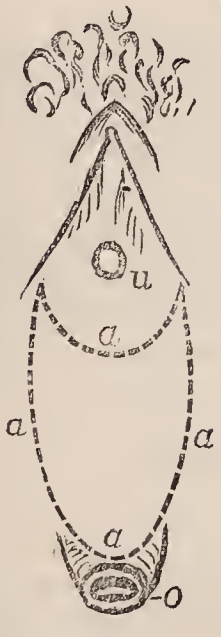


FIG. 1.

plete union by the first intention along the whole line;—*o* being the os tincæ, *u* the urethra, and *s*, *s*, *s* the stellate

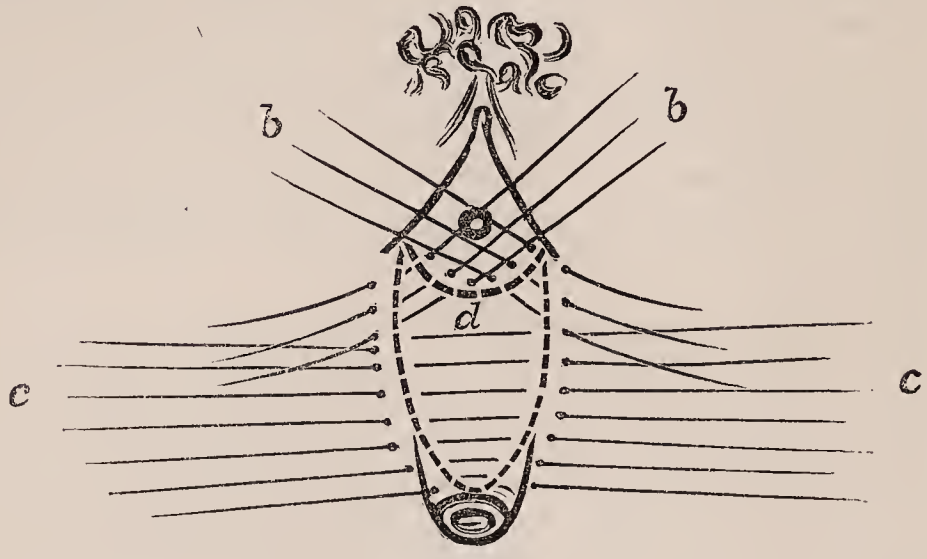


FIG. 2.

lines of suture. There is more fore-shortening than is depicted in the figure, so that the orifices of the urethra and os tincæ are brought nearer to each other than in the relaxed state of the anterior wall of the vagina before the operation. I leave the twisted wire sutures fully an inch in length, and having fixed them all in position, I then, with a forked wire-twister, roll each up into a ball. Forked wire-twister, *vide* fig. 4.

FIG. 3.

This prevents any vaginal irritation during the healing process, and facilitates the process for removal of the sutures. A pair of dissecting forceps may be used for the same purpose, but not so easily or neatly. This completes the first half, or the anterior portion of the operation of elytrorrhaphy. If the patient is debilitated, and gives such indications of shock as to render it advisable not to do more at one sitting, she may be

FIG. 4.

left to rally her strength until the union has become complete and the parts consolidated, care, however, being taken to support the uterus and vagina by a plug and perinæo-vulvuo pad, to prevent strain upon the sutures, cutting of the mucous membrane, and consequent risk of failure of the operation.

But almost invariably the whole operation can be completed forthwith. To do this, the cervix uteri is again seized with a vulsellum, and slightly tilted forwards and downwards, taking care not to do so further than the extent of the normal prolapsus; it is then held in position by an assistant. The rectum is now examined to see whether it is empty or not, and a pair of artery forceps fixed in each side of the vulva, a little anterior to the normal position of the fourchette. These are held by the assistants, one on each side, so as to make the parts tense. The operator then, with the fingers of his left hand, puts the lax posterior vaginal wall and perineum, or what may remain of it, on the stretch, and with a sharp scalpel, makes a wedge or A-shaped incision, whose apex reaches the posterior part of the cervix uteri, about one inch from the os tincæ. This incision is carried downwards as far as the ramus and inner surface of the tuber ischii. *Vide* fig. 5, *o*, os tincæ; *a*, *a*, wedge or A-shaped lines of incision; *ii*, rami and tubera ischii. Here the mucous membrane of the vagina is marked by a series of deeply indented rugæ showing where the tube is firmly attached to the hard parts. The next lines of incision are indicated in the diagram by *b*, *b*, *b′*, *b′*, mapping out the usual crescentic or quarter-moon lines of demarcation, as in the true flap operation, or for entire removal of mucous membrane in perinæorrhaphy. There is, however, no such sharp angular curve as is seen in the figure, which will readily be perceived when the tubular form of the vagina is remembered and brought before the mind's eye. The line *b′b′* may have to be carried close to *r*, the anus, as the more or less complete rupture and destruction of the perineum may demand. After the piece of mucous membrane has been dissected off and pressed flat, it has the A shape more extended in the limbs, and a segment of a circle or ovoid forms its base. Great care must be taken not to injure the rectum, for if it is bulged out by flatus, or suddenly by the patient retching, there is considerable risk of doing so. Hemorrhage is generally more free than in the anterior part of the operation, and several large vessels may have to be ligatured as they are opened. The upper part of the wedge-shaped mucous membrane has to be carefully dissected off, which may be a little tedious, but the perinæorrhaphy can be done rapidly by transfixion, so that a skilful

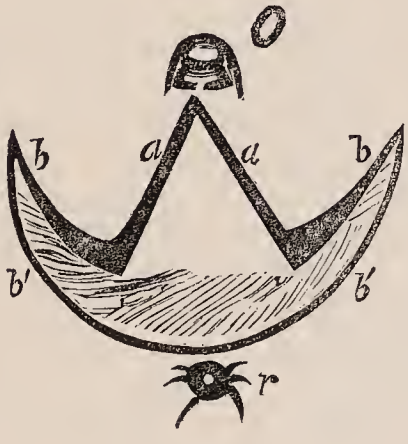


FIG. 5.

operation may complete the separation of the lower mucous membrane by two or three movements of the knife. Here the greatest hemorrhage arises.

In the manner just described the operation was performed in this case. It now remained to pass the sutures, and this was done, not with small sewing needles and needle-holders, but by a large curved needle with a handle, of which I have devised several with varying curvatures. The needle is first passed through the two flaps of mucous membrane, then the wire is quickly passed into its eye and bent, and needle and wire are well drawn together. The needle is disengaged, and the wire left *in situ*. For rapidity and ease this method is superior to all others, and it may be applied in the deepest recesses of the vagina. The sutures indicated in fig. 6 by *tv*, the transverse

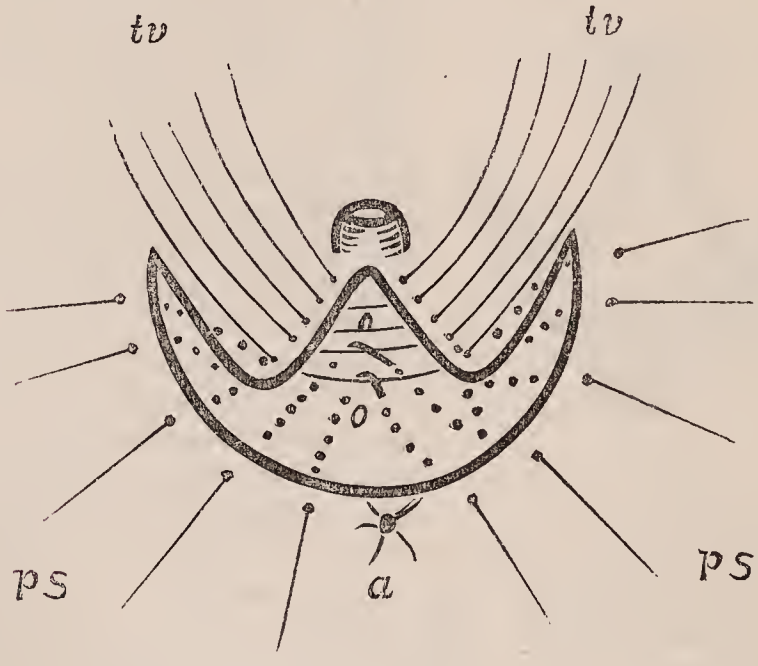


FIG. 6.

vaginal ones, were first passed, beginning at the upper or cervical suture first; five, six, or even eight may be required. Next the perineal ones *ps* were passed deeply, that next the anus, *a*, being introduced first, and looped round the lowermost of the transverse vaginal sutures. The next was passed in the same way, and the remaining sutures as indicated in the diagram, in the usual manner. By means of Coghill's wire-twister the vaginal sutures were brought together, and twisted wire left to the length of from one to two inches. These were fixed in a bundle and left in the vagina pointing to the vulva. The perineal sutures were then tightened up in the order of their introduction, and their twisted ends, an inch long or so, rolled into a ball with the fork-twister. During the fixing of

the latter, the patient's knees were tied together with a soft handkerchief, a pad having been placed between them. Carbolic lotion, vaginal washing, carbolic oil, dressing externally, and a vulvo-perineal pad completed the operation.

The patient did not suffer from shock, and with the exception of pretty severe cystitis, which yielded in three or four days to phenol lotion injections, and morphia and henbane internally, she made favourable progress to recovery. On the tenth day the perineal stitches were removed, as they began to cut their way out. At the end of three weeks the deep vaginal sutures were removed, all discharge having ceased under carbolic lotion injections. A pessary of tannic acid was ordered daily, and the antiseptic lotion to be continued once daily, as a matter of cleanliness.

The patient was then fitted with a pelvic binder, and vulvo-perineal pad, and permitted to sit up and walk about a little. The perineum was strong and perfect, and the vagina as small as in girlhood. All pelvic discomfort had entirely gone, and the general health, when I saw her last, May 25, was much improved. As she is a stout woman, with lax tissues, she was advised to rest for three or four months, to avoid all active exercise and efforts in lifting weights, spend a good deal of time in the horizontal posture, and live *absque marito*.

It might be objected that, in narrowing the lower portion of the vagina and leaving the upper comparatively untouched, the correct formation was interfered with. But this is not so. On examination immediately after operation, as well as after removal of sutures, it will be found that the perineum and vagina have the normal form and position as in the virgin, the upper part of the tube being somewhat larger than the lower. One would expect some form of version of the uterus, but so far I have only seen this once, and it need not necessarily arise, especially if the perineal and posterior vaginal parts of the operation are well performed. But even if a uterus that had undergone the atrophy of age become verted, I should not apprehend any bad symptoms arising, and in like manner, just as we find many cases of retro- and ante-version, which during menstrual life give rise to no symptoms whatever, we might hope that the same would attend any such accident in those operated on, as in the case noted, the more so as the version would prevent prolapse.

Since the above was written, a case of many years' standing of ruptured perineum and rectocele with laceration and eversion of cervix, and retroversion and procidentia in first stage, came into the Thornton Wards. Her history is that of failure of every method of treatment for many years, and confirmed invalidism. I performed the operations for lacer-

ation of cervix and ruptured perineum and rectocele, May 31, 1881, and the patient does well. In a future communication I will continue the investigations into this subject, and give the full details of this and other cases that may come subsequently under my care, stating candidly those that failed, as well as those where a radical and permanent cure resulted.—*Liverpool Medico-Chirurgical Journal, July* 1881, *p.* 30.

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## 68.—ON AN IMPROVED METHOD OF TREATING UTERINE DISPLACEMENTS.

By Robert Bell, M.D., Physician to the Glasgow Institution for Diseases of Women and Children.

It would be quite foreign to the object of this paper were I to enter upon the symptomatology of uterine displacements. These are so well known that I will now only speak of a remedy which, while it acts as a support to the organ, also does duty as a medicinal agent, and stimulates to a more healthy action the surrounding parts. I may be permitted to remark that I have had this remedy as it now stands in use for about two years, and during this period have treated over 200 cases by means of it alone. In fact, I have not used a pessary during the past eighteen months. Amongst the cases so treated every form, and I think I may add every gradation, of displacement has come under my observation, and I can confidently assert that in every case great relief was obtained, and in the majority of cases a complete cure was and is the result. There is certainly this disadvantage in it—the patient requires to be under careful and patient observation for weeks in every case, and in many instances for months at a time; but surely these are trifling objections when we know a woman's health and her husband's and family's happiness are in the balance. Before being led to employ the present application I had used more or less, for years previously, the ordinary glycerine of tannin of the pharmacopœia; but though I found it a most efficacious astringent, and that it answered the purpose I had in view most admirably, yet its expense was a decided barrier to its universal employment, and, moreover, it had the disadvantage of staining the underclothing so much that this of itself told very much against it ever being adopted as a popular remedy. I therefore had recourse to the following solution:—Glycerine, 80oz.; alum, 10oz.; carbolic acid, $1\frac{1}{4}$oz. It is well known to gynecologists that glycerine applied on cotton tampons has a most beneficial effect in stimulating the capillary circulation of the uterus and pelvis; moreover, that it acts as a depleting agent, insomuch that it drains the blood of a certain portion of its watery constituents by virtue of its great affinity for water. In short, if there is hyper-

trophy of the organ or of the cervix alone, we have in glycerine tampons a great aid to the treatment of such cases. It is a matter of observation that if a displacement continues for any length of time, hypertrophy of some portion or of the whole organ is the result. We have thus a greater strain thrown upon the uterine supports, so that what at one time was a result becomes a factor in aggravating the disease. Our first duty, then, is to endeavour to reduce the overgrowth, and at the same time prevent its recurrence by rectifying the position of the organ and retaining it *in situ*. It must also be observed that when we have a hypertrophied condition of the walls of the uterus, in the majority of instances there is softening of the texture, so that a flabby condition results. In these cases it is a matter of little difficulty to restore the position of the organ, but as soon as the support is removed it falls back into its abnormal position. Moreover, if there exists (which frequently does) any amount of inflammatory action, the presence of a pessary is a most serious source of danger; and besides, supposing there is no danger of an attack of acute metritis, there yet remains the disadvantage that the relief is entirely due to the fact of a mechanical support being retained in the vagina, and which every little while requires to be removed to make way for one of larger size, till in the course of a short time the walls of the vagina become as capacious as the pelvis will admit of; moreover, the woman always retains the disagreeable consciousness that she is wearing an instrument, and, let me add, there is ever present the danger of the hard pessary injuring the soft parts upon which it is constantly resting. It is well known that for a pessary to be of service, and to be clad with the minimum risk of danger, it must fit accurately, and it is only long experience and patient care that will ensure this result. If it does not apply itself with precision to the parts it is worse than useless, and may—nay, certainly will—result in serious mischief. One advantage of my treatment, and no mean one, is, that it is rarely necessary to employ either the probe or elevator when there is a flexion. This is another prolific source of danger removed.

Let us first consider *prolapse* of the uterus. This, as we all know, may vary from a slight lowering of the position of the womb to complete procidentia. It is due either to (1) an increase in weight of the organ; (2) to faulty action of the supports; (3) it may arise from pressure from above, as has been before pointed out, or from all these factors combined.

If there is a lacerated perineum, this must of course be rectified before any treatment can be followed by beneficial results. From whatever cause prolapse occurs, there is always, as a result, hypertrophy of the organ and relaxation of the vaginal

walls and uterine ligaments. If the uterus, then, is elevated to its normal position, and retained there by a suitable appliance, the hypertrophy will disappear; and if at the same time we can stimulate the capillary circulation of the parts, and also cause a steady drain to take place of the watery constituents of the blood in the uterus and its neighbourhood, we shall do much to remove the tendency to the displacement by reducing the size of the organ and simultaneously strengthening its supports. This end is attained most satisfactorily by replacing the prolapsed uterus in its normal position, and retaining it there by a tampon of cotton saturated with the glycerine of alum and carbolic acid, and allowing this to remain in the vagina for from three to four days. The presence of this tampon excites an abundant water discharge from the vagina, necessitating the patient constantly to wear a napkin. Glycerine, as has just been observed, excites this discharge, but when combined with an astringent, the effect is an even more profuse drainage of the watery components of the blood; moreover, the effect on the capillary circulation is also intensified, and the astringent effect on the vaginal walls is most beneficial. By this means alone I have had the satisfaction of seeing patients completely cured of procidentia which has existed from three to eight years, after the above treatment has been persevered in for a period varying from two to seven months, and in a few cases where the disease has existed for a much greater length of time very great relief has been experienced after a more protracted course of treatment. If the tampon is merely saturated with glycerine it becomes very offensive after a few hours, and if with glycerine and alum alone, although it does not become fœtid so soon, yet it will do so much too rapidly to enable us to get the full beneficial effect. When, however, the carbolic acid is added, it will be found that there is no fœtor at the end of four days, when the tampon may be removed, to be replaced by another. By this means we can keep the organ *in situ* for weeks and months together, and likewise act on it and the neighbouring tissues with such an advantageous result as to restore them to a healthy condition, while we also have the satisfaction of seeing the woman's general condition indicating a marked improvement, which certainly very much increases the probability of the benefit derived from the local treatment being permanent. I claim for this method of treatment equal advantages with any plastic operation that may be performed upon the vaginal walls; and there is this to boot, that the uterus itself also probably partakes of benefits which an operation on the vaginal walls cannot confer.

Let me now turn to the treatment of versions and flexions of the uterus; and perhaps I may be permitted to remark, without the slightest wish on my part to exhibit a spirit of boasting, that

I have treated quite a number of cases which before coming to me had been subjected to the general routine of pessaries and stems without deriving any benefit whatever, and which have, after a few applications of the tampon, expressed themselves as feeling great relief. It may perhaps be interesting to give details of one case. This lady had been suffering from retroflexion of the uterus for six years, which certainly was aggravated very much by obstinate constipation, but this symptom had been quite overlooked. When I saw her first she was a most miserable-looking object, with an ashy complexion, which, however, was partly attributable to the absorption of fœtid matter from fæcal accumulations in the rectum and colon, as when these masses were removed and kept from accumulating, her complexion improved, and she felt somewhat relieved in every way. Yet the least exertion completely prostrated her, and the dysmenorrhœa was most intense. For six years she had been under treatment by means of pessaries and stems of all descriptions, from solid silver stems down to pessaries made of gutta-percha covering copper wire, and with no benefit; in fact, she was daily getting worse, and had lost all heart. In this case I used *two* tampons saturated with the solution, one much smaller than the other, so that it would occupy a position supporting the fundus, well up in Douglas's pouch, while the other and larger tampon was placed behind the cervix, and acted as a support to the smaller of the two. After three months of this treatment she was so far restored to health as to be able to endure a considerable amount of fatigue, and eat and digest satisfactorily, and sleep well, feats she could not perform before; and at this moment I know she enjoys life thoroughly.

I think it often a good plan to employ two tampons in retroflexion and also in anteflexion, but, as a rule, one answers all the purpose.

It is gratifying to observe the speedy effect of this treatment on the bladder symptoms in anteversion and anteflexion. I think I need hardly enter into any further details as to the method of treating the other varieties of displacements, as it will be obvious to all how each variety may be individually relieved. It may be urged against this method that it is necessarily very tedious in the carrying of it out. Certainly it is; but then any medical man with an average amount of intelligence can, under proper directions, manage an ordinary case of displacement requiring treatment. There is no danger to apprehend from a badly-fitting pessary with its horrible train of symptoms, and there will be more complete relief speedily attained than any pessary can give.—*Edinburgh Medical Journal, July* 1881, *p.* 29.

## 69.—CASE OF CÆSAREAN HYSTERO-OÖPHORECTOMY, OR PORRO'S OPERATION.

By Alex. Russell Simpson, M.D., F.R.S.E., Professor of Medicine and Midwifery in the University of Edinburgh.

[After relating the case in which he recently performed this operation, Prof. Simpson makes the following observations on the object of and indications for the operation, and the technical proceedings for carrying it out.]

Porro was led up to his bold proposal by a consideration of the conditions under which the Cæsarean section had been so frequently fatal. In his own city, for example, no woman who had ever been subjected to the operation had survived. It seemed to him that the chief source of danger lay in the wounded uterus. This was sometimes the source of a fatal hemorrhage. In whatever way the lips of the incision might be brought together at the moment of operation, they were liable, in the changing moods of the puerperal uterus, to become separated. There might take place an escape of blood, not immediately dangerous in amount, but dangerous from its liability to escape into the peritoneal cavity, where it sometimes set up fatal peritonitis. The usual puerperal secretions from the inner surface of the uterus were liable to escape into the abdomen. The tendency to peritonitis was further increased by the chance of septic matters passing up along the genital canal and through the gap in the uterine walls. All these risks were likely to be lessened, if not entirely removed, by the removal of the injured organ. The wound-surface of the stump would not be so great as that of the necessary incision through the uterine parietes; and the stump would be amenable to the means of controlling hemorrhage that have given good results in the removal of ovarian and uterine tumours through an opening made in the walls of the abdomen. Fortified by such considerations, and by the results of experiments on the lower animals, which showed that more recoveries took place when the wounded gravid uterus was removed than when it was left after the fœtuses had been extracted by Cæsarean section, Porro carried out his idea successfully in the woman who was thus the first in Pavia to survive a Cæsarean labour.

The removal of the ovaries is a necessary complement to the removal of the uterus. The loop that encircles the neck of the uterus has the ovaries within its embrace; and they are cut off with the uterus, instead of being left adherent to the stump. If they were left, and retained their vitality, the return of their functional activity might easily give rise to periodical troubles in a patient to whom they were no longer of any physiological value.

It is no drawback, but rather an advantage attaching to this procedure, that it annuls the further reproductive powers of such patients as are fitting subjects for its employment. For the most part, they are delicate, deformed, diseased, without the power to rear and care for more than a single child. The cases are few, where a woman who has to be delivered by a Cæsarean operation will be anxious to multiply her children.

As experience has grown in connection with Cæsarean hystero-oöphorectomy, further advantages have been found to attend it. In cases of malacosteon, for example, which furnish a notable contingent of the women operated on, the patients who survive have been seen in one or two instances to recover distinctly from their disease. After any other kind of delivery, cases of malacosteon usually become worse; and the successful result of these Porro's operations has raised the question whether double oöphorectomy should not be had recourse to as a curative measure in other cases also.

Again, we are not obliged to wait the onset of labour, or to use means to start it, as in the ordinary Cæsarean operation we are compelled to do. The chances for the child are thus greatly improved; and, as it sets us free to choose our time for operating, we put the mother also in a more favourable position for success.

Such being the nature of the Porro procedure, it is easy to see what are the

*Indications for the Operation.*—It will be applicable to all the cases where Cæsarean section is called for. British obstetricians have always been very shy of this grave operation. Indeed, but for the faithful advocacy of Hull and Radford, it ran some risk of being ranked among the condemned operations.

*Technic of the Operation.*—In carrying out the operation itself, we begin with

1. *Incision through the Abdominal Wall.*—The only question, in regard to this incision, is that concerning its length. All operators now make the opening in the linea alba, but of lengths varying from $5\frac{1}{8}$ inches (13 centimètres) to upwards of 7 inches (18 centimètres). The shorter incision is certainly to be preferred, and it should run from below the umbilicus to within 3 centimètres of the pubes. When it becomes necessary to elongate it, it should be extended upwards to the left of the umbilicus. Operators who have made the long incision, have done so in carrying out a modification first suggested and carried out by Professor Müller of Berne. The modification consists of enlarging the abdominal wound sufficiently to allow the protrusion through it of the unwounded uterus, which is to be surrounded with a cord, or with the noose of a *serre-nœud*—so that the circulation is arrested before the incision is made

through its walls. The object of this modification is to lessen the risk of escape of blood and uterine contents into the abdominal cavity.

This preliminary extrusion and constriction of the uterus, however, introduces special elements of danger. To the mother, there is the additional risk attendant on a larger wound; the increased exposure of the peritoneal cavity; and the liability to protrusion and injury of the intestinal coils. To lessen these, the upper part of the wound had sometimes to be stitched up before the opening was made into the uterus. Even when the wound was of considerable length, difficulty was experienced in getting the uterus to protrude, and its size had to be diminished by evacuation of the liquor amnii. So for the child, fresh risks are incurred, especially from the interference with the placental circulation, leading to temporary asphyxia, and probably to attempts at intra-uterine respiration. Hence, for example, in Dr. Elliott Richardson's, the only successful case that has yet been reported from across the Atlantic, he says: "At birth, the child was in a condition of suspended animation—so that considerable effort had to be made at resuscitation." To such risks, I think, we are hardly warranted in subjecting the child. The only condition in which it might be advisable to continue Müller's procedure would be where the waters had been evacuated, the child being dead, and the uterus possibly the seat of noxious material. In all other circumstances, contenting ourselves with a short abdominal incision, we proceed with

2. *Incision through the Uterine Wall.*—It is during the opening of the uterus that there arises the greatest risk of hemorrhage. The risk is, of course, increased, if the line of incision fall through the placental area. This risk may be quite inevitable. If our palpation have led us to suspect that the placenta is attached to the anterior wall, if the blueish appearance of the uterus as it appears through the abdominal opening confirm the impression, and if Halbertsma's suggested application of Middeldorpf's akidopeirastic make us sure, we still do best to cut through the centre of the anterior wall. To make the incision closer to the margins of the uterus, simply introduces the risk of wounding the large branches of the uterine arteries. The hemorrhage, as I have stated, in my own case was trifling. I had the advantage of having to do with a quiescent uterus, and an anterior wall free of placental attachment. The opening, made with a sharp bistoury, in the upper part of the surface, was carried right through the membranes of the ovum, and of size sufficient to allow of the introduction of the finger, which guided a probe-pointed bistoury in extending the incision downwards. It must be of length sufficient to allow

3. *Extraction of the Child.*—This requires to be accomplished

with all possible rapidity. Perhaps, in most instances, it does not greatly matter how the child is laid of. I notice that, in a large proportion, it has been seized by the lower limbs, and so extracted. But, as the interference first with the uterine walls, and then with the child itself, is apt to excite it to respiratory efforts, if the uterine wall close around the neck, as has sometimes happened, these respiratory efforts endanger the vitality of the child as long as the head is within the uterus. Hence, it is theoretically better to lift out the head first; and, in the case I have related, it was practically easy of accomplishment.

4. *Management of the Placenta.*—As the Cæsarean operation used to be carried out, the next step consisted in the detachment and removal of the placenta and membranes. The uterus had to be emptied and security taken for a free escape of its contents through the cervical canal. That Porro and others, before proceeding to extirpate the uterus, should have continued to remove the placenta, seems to me only a survival of the old method of operating. There is no good to be gained by it; for the uterus collapses sufficiently to allow its easy extrusion through the abdominal orifice, though the placenta be left adherent to one of its walls. The separation and extraction cost some valuable seconds, and must occasion and allow an increase of the hemorrhage.

5. *Securing of the Stump.*—In carrying out the utero-ovarian extirpation, two different methods have been followed, corresponding to the two methods employed in the removal of these organs when they are the seats of morbid growths. The pedicle has sometimes been secured according to the extraperitoneal method; sometimes according to the intraperitoneal.

*a. Extraperitoneal Treatment of the Pedicle.*—In carrying out this method, operators have encircled the uterus and broad ligaments about the level of the isthmus with the noose of a wire écraseur, such as the serre-noeud of Cintrat (which was the instrument used by Porro in his first case), or with a similar instrument furnished with a thin strip of metal instead of wire for constriction, or with such a chain as is found in the ordinary écraseur. When the wire or metallic loop or chain has been tightened so has to compress the structures firmly without producing any laceration of them, the uterus, Fallopian tubes, and ovaries are cut off with knife or scissors, and the stump in the grasp of the constrictor is secured in the lower angle of the abdominal wound. The portion in the bite of the écraseur sloughs and separates, at a period varying from fourteen to fifteen days.

This method has, *first*, the advantage of being capable of rapid execution, so that there is a correspondingly brief exposure of the peritoneal contents. It allows, *secondly*, perfect

control of the wound, which is brought to the surface. *Thirdly*, it lessens the risk of any exudation taking place after the operation into the peritoneal sac.

*b. Intraperitoneal Treatment of the Pedicle.*—When the pedicle is to be treated so as to be dropped and left to heal within the peritoneum, the uterus must first be provisionally constricted with an écraseur or an Esmarch's band, or an ordinary piece of fish-line or whipcord. At some distance above this constriction, the uterus is clipped or cut off. A needle in a fixed handle will then carry a strong double silk ligature through the centre of the stump, just below the constricting band. The ligature is divided, and the needle withdrawn. The same needle then carries through the lower part of the left broad ligament a single thread, which will serve to secure the utero-ovarian vessels of that side. The needle, before being withdrawn, is to be threaded with one end of the double ligature, which had been carried through the middle of the stump. This will be used to secure the large uterine artery and vessels in the left half of the isthmus uteri. The needle will in the same way, be passed with a single thread through the right broad ligament, and, as it is withdrawn, will bring back the other end of the double ligature that had first been introduced. I have stated in my report how I thought to simplify this procedure by using three ligatures instead of four, but was obliged eventually to introduce the four. Veit brought the edges of the peritoneum together over the cut surface, according to the plan recommended by Schroeder.

The favourable results obtained from this intraperitoneal method of treating the stump of ovarian tumours—results much more satisfactory than those obtained by the use of the clamp—led one to believe that, in Cæsarean hystero-oöphorectomy, it will betimes also give better success; but as yet the results have been disappointing.

6. *Cleansing of the Peritoneum.*—In most cases, more or less blood has passed into the peritoneal cavity. This may occur even where the uterus has been brought through the abdominal wound, and ligatured before being opened. The peritoneum requires, therefore, to be carefully cleaned out; and some operators have proceeded, further, to establish a drain through the pouch of Douglas and the vaginal canal, so as to prevent the accumulation of blood and serum in the cavity. For the most part, such drainage is unnecessary.

7. *Closure of the Wound.*—The abdominal wound is closed, as after an ovariotomy. Where the pedicle is secured in the lower part of the wound, it must be cauterised freely, so as to wither the surface; and it must be dressed with antiseptic cotton, which will absorb the discharge which sometimes occurs very freely from it.

The patients who have survived have usually had a period of convalescence of one or two months, protracted in some instances by umbilical herniæ or cervical fistulæ. Among the fatal cases, death resulted in twenty from peritonitis, in three from hemorrhage, in two from shock, in two from tetanus, in one from thrombosis, and in one from pulmonary œdema.

*General Result.*—If we look at the general result of all the cases we have brought together, we see that 30 mothers were saved, and 42 lost; and 57 children were saved, and 14 lost; whilst the condition of the children in one of the cases is unknown. This gives a total of 87 lives spared, and 56 lost. If the patients had been delivered by some of the head-crushing procedures, then all the 72 infant lives would have been sacrificed; and, with the usual loss of about 1 in 5 mothers, there would have been at least 14 maternal deaths; that is to say, at least 88 of the 144 lives would have been lost, and only 58 saved. The proportions would nearly have been reversed.—*British Medical Journal*, *June* 18, 1881, *p.* 956.

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## 70.—A CASE OF REMOVAL OF THE UTERINE APPENDAGES.

By Lawson Tait, F.R.C.S., Birmingham.

So much interest is being expressed in the operation which has been termed "oöphorectomy," and there is so much of a disposition to prejudge it, that I desire briefly to describe one of my recent cases in which, like many others, my only regret is that, instead of temporising so long with the patient as I did, I did not press the only real remedy which the case admitted. I have reason to believe that many unfounded rumours are abroad, that those who have adopted a wide extension of abdominal section are operating in a reckless fashion. I can only say that in my own practice I think no evidence of this will be found, and the following case will prove much to the contrary.

Mrs. L., aged 34, was sent to me by Dr. McLintock of Church Stretton in Sept. 1878. She had been married four and a half years, and had one child in 1875. Since her confinement, she had never been well, and had suffered from symptoms which clearly were those of subinvolution and retroflexion. She had profuse menstrual hemorrhage; and, on consulting a physician in July 1878, she was told she had a tumour behind the womb, and that the womb must be dilated and the tumour removed. For this purpose, a sponge tent was introduced, and left in, according to her reiterated statement, for nine days. She suffered from an attack of acute "inflammation of the bowels," and was in bed for seven weeks. This incident occurred, I am pleased to say, neither in Church

Stretton nor in Birmingham. When she came to me on Sept. 24, 1878, she was in a wretched state of exhaustion and emaciation. I found a mass on the right side of the uterus, which fluctuated indistinctly. The uterus was retroflexed, and fixed completely by perimetric effusion. I tapped the mass, and removed about four ounces of pus from what I now know was an abscess of the right ovary. She was much relieved, and returned to Church Stretton under Dr. McLintock's care, and slowly gained some strength. She never made anything like a recovery, however; and her medical attendant sent her back several times to me, and together we carried on a great variety of treatment without much benefit. The uterus remained fixed, and all efforts to replace it were so painful that she could not endure them. She could not bear intercourse; she never was a day without pain; and her life was fitly described as a burden to her and her relatives.

Dr. McLintock sent her down to me again at the end of last Feb., and in his letter he told me he was sure something more must be done if our patient's life was to be saved. I found that the mass on the right of the uterus was just as I had left it; that the uterus was still fixed and retroflexed; that there was now a more clearly defined mass to the left of the uterus; and that the whole roof of the pelvis was exquisitely tender to touch. Her temperature went up at night, and she had night-sweats; and, though I could feel no fluctuation, I had no doubt there was pus somewhere. I therefore advised and performed an exploratory incision on March 6. I found the pelvis roofed over by adherent coils of intestine, which I lifted with much trouble. Below these, the whole of the organs were matted together, and their identification was a matter of the greatest difficulty. Finally, I succeeded in recognising the right Fallopian tube, distended into a cyst, with greatly thickened walls, and full of pus. Below it, and intimately adherent to it, lay the ovary, as large as an orange, and containing some old cheesy matter—the remains, probably, of the abscess I had tapped two years and a half before. The uterus was bound down in the *cul-de-sac* by old adhesions, and from these I relieved it. I found the left ovary adherent below the fundus; and from it the left Fallopian tube ran a circuitous course, like a sausage in appearance, and adherent to the brim of the pelvis, the uterus, and a piece of small intestine. It contained about two ounces of pus. I removed both ovaries and both tubes, cutting the latter off close to their uterine attachments. The hemorrhage during the operation was very troublesome, but was controlled by sponge-pressure. Mr. J. Raffles Harmar assisted me, and Mr. Wright Wilson gave ether.

The patient has recovered without a bad symptom, and is

perfectly free from pain for the first time since the incident of the sponge-tent. The uterus is (to-day) perfectly free, and any movement of it gives her no pain. My only regret about this case is, that I did not operate two years ago.—*British Medical Journal, May* 14, 1881, *p.* 766.

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## 71.—ON SOME RECENT IMPROVEMENTS IN THE MODE OF REMOVING UTERINE TUMOURS.

By T. Spencer Wells, Vice-President of the Royal College of Surgeons; Surgeon to the Queen's Household.

In two valuable articles on "Abdominal Surgery" in the Boston Medical and Surgical Journal of March and April last, the removal of uterine tumours is spoken of as "a direct outgrowth from ovariotomy," and the history of the operation is sketched from my first case in 1861 to the present time. In 1863, my experience of four cases led me to the conclusion that "it would be only under most unusual circumstances that I would again remove an interstitial fibrous tumour of the uterus; a peritoneal outgrowth, or an ingrowth towards the uterine cavity and vagina, offering, in my opinion, far more probability of successful removal than an interstitial tumour." Ten years later, in 1873, further experience had brought me to the opinion quoted by the Boston reviewer, that "when a uterine tumour is pedunculate, or can be separated from the principal part of the uterus, or when the whole of the fundus and body of the uterus, with or without the ovaries, can be removed, leaving the cervix and its vaginal attachments uninjured, the operative question is a different one, and recent experience is leading to a more encouraging view of the surgical treatment in such cases."

After five years' additional work, I brought the surgical treatment of uterine tumours before the College of Surgeons in the Hunterian Lectures, giving the result up to that date of all my operations through the abdominal wall, amounting to forty-five cases. In the two years which followed this lecture, I adopted two important modifications in the operative procedure—first, the more complete use of antiseptic precautions; and secondly, the union by suture of the peritoneal edges of the divided uterine wall. I also contrived better pressure-forceps for securing divided blood-vessels before tying. In the paper read at the Cambridge meeting of our Association in August 1880, I said, "Whatever doubt some may entertain as to the value of my experiments on animals, and practice on women, in leading most operators in the present day to bring divided edges of peritoneum together whenever they have been separated by wound or by operation, I myself have no doubt

whatever about it; and just as strongly as I assert that it is, and must be, better, when the abdominal wall is divided, to bring the peritoneal edges and surfaces of the opening together, restoring the complete closure of the peritoneal cavity, than to leave the cavity free to the admission of fluids oozing from wounded muscle, fat, and cellular tissue, and to allow contact of intestine and omentum with anything more than peritoneum; so strongly—more strongly if I could—would I insist that the peritoneal edges of the divided uterine wall, or of the connecting part of the outgrowth with the uterine wall, should also be carefully brought together....by many sutures, or by uninterrupted suture along the whole extent of the gap." In concluding that paper, I alluded to a case then under observation, which I brought forward partly to illustrate the advantage of completely uniting by suture the divided edges of the peritoneal wall, and partly to argue that when the uterine cavity has been opened, it is better not to close the mucous surfaces also by sutures, after the method of Schröder, as the opening left for some oozing of blood through the vagina may sometimes be useful. A few more details of this case may be now given.

On June 9, 1880, I saw a married lady, aged 62, in consultation with Dr. Richard Smith, of Haverstock Hill, who had been called in about a fortnight before, on account of uterine hemorrhage. This, after twelve years' absence, had come on at the end of 1879, and had recurred since every three weeks, lasting one week. She had consulted an obstetric physician four years before, who said that there was "ovarian enlargement." She had been married twice, had one child by her first husband, twenty-nine years ago, and had never been pregnant since. With the return of the uterine hemorrhage, there occurred enlargement of the abdomen, which increased rapidly, loss of flesh, shortness of breath, and very obstinate constipation. The girth of the abdomen at the most prominent part was 42 inches. The uterine cavity only measured $2\frac{3}{4}$ inches, but the cervix moved in all directions with a large semi-solid tumour, which filled the whole abdomen quite up to the ensiform cartilage. I removed the tumour on the 21st of July, 1880, cutting away nearly all the supravaginal portion of the uterus, and after tying all bleeding vessels carefully, sewing together the peritoneal edges of the divided uterine wall. For about three days afterwards, a little bleeding went on through the vagina, but the patient recovered without any febrile elevation of temperature, and is now in excellent health. The doubt as to the tumour being ovarian was accounted for by the fact that a large cyst-like cavity in the centre of the tumour contained thirteen pints of bloody fluid, while the solid portion weighed only a little

more than two pounds. I am much indebted to Dr. R. Smith for his assistance at this operation, and for his care of the patient afterwards, as she remained in his charge during my absence from London.

In this and previous cases, I had been content with the pressure-forceps described and figured in the British Medical Journal (*Retrospect*, vol. lxxx, p. 148); but, feeling the want of more effectual means of securing bleeding vessels before dividing them, I had forceps made similar in form, but with longer handles, and a compressing surface more than an inch in length. With several pairs of such forceps, applied before any tissues are cut through, large tumours may be cut away with only very small loss of blood. They were used, with excellent effect, in the following case.

On Sept. 27, 1880, assisted by Mr. Thornton and Mr. A. Doran, I removed a large solid uterine fibro-myoma from a single lady, aged 41. By an incision eight inches long, the tumour was exposed, or rather the omentum, containing very large veins, which covered the tumour and adhered to it. Two ligatures were applied to the omentum, which was then divided between them. Some adhesions to the abdominal wall were then separated, and the tumour turned out entire. It was an outgrowth from the left side of the fundus uteri. The band of connection between the uterus and the outgrowth was between two and three inches in length, and about one inch in breath. This was first compressed and held by two of the large forceps just described, and the tumour was cut away. Then a large needle and double thread was pushed through the uterine tissue behind the forceps, and each thread was tied as the forceps were taken off. Lastly, the peritoneal edges of the divided uterine wall were brought together by an uninterrupted suture of fine carbolised silk. After the removal of the tumour, the rest of the uterus appeared to be quite normal in size and consistence. Both ovaries were healthy. Recovery went on without fever—the highest temperature was 100·2°. There was unusual nervous irritability during convalescence, perhaps explained by the facts that her father and an uncle had both been insane, and attempted suicide; but she went away thirty days after the operation, in a very good state of health, and has since been quite well. Mr. Doran described the tumour as a solid uterine fibro-myoma, weighing between seven and eight pounds.

The tumour in the following case was very much larger, and the patient in a state of the utmost distress from its weight and pressure. It was a solid fibro-myoma, which weighed twenty-five pounds, after all blood and serum had drained from it. I removed it on Oct. 7, 1880, assisted by Mr. Thornton, Mr.

Vevers of Hereford, and Mr. Orton of Foleshill, near Coventry. The incision was eight inches long. Three to four pints of clear fluid escaped on dividing the peritoneum. A nodular solid tumour was covered by vascular adherent omentum. This was tied and divided. There was no pedicle. The growth was a prolongation, or irregular enlargement, of the fundus uteri. After fixing each end of the narrowest part of the neck of the growth by pressure-forceps, I amputated the fundus just beyond the forceps, opening the uterine cavity at the posterior part of the growth. Six portions of uterine tissue were tied, after three transfixions, with double silk ligatures, as the forceps were removed, and several large vessels were also tied separately. The peritoneal coat of the uterus was then united by a line of uninterrupted suture, so as to cover up the divided uterine tissue. The line of union measured between three and four inches. More than a pint of blood was lost. I made no note of the state of the ovaries. The patient was extremely weak for a fortnight after the operation; but she went to Coventry at the end of a month, and she called on me in May 1881, in excellent health. I could detect nothing by abdominal or pelvic examination, except the linear cicatrix in the abdominal wall, to show that any operation had been performed. The catamenia are quite regular, and had only been excessive for the two or three periods just after the operation.

I had seen this patient several times during the six years from the discovery of the tumour till the operation, and had at first dissuaded her from any interference, on account of a strong vascular thrill always felt in the left side of the vaginal wall. It was not till ascitic fluid formed, and the tumour became more mobile, that I agreed to operate. The vascular thrill was explained by omentum adherent to the lower part of the tumour, and containing very large blood vessels.

The next case is also one of almost unexpected, but complete, recovery. In May 1876, a married lady, aged 38, called on me with a letter from Dr. Birch, of Hazaribagh, in India, under whose care she had been since May 1875. She was married in 1871, went to India in the same year, had never been pregnant, but remained in good health until she suffered from fever in September 1874. In February 1875, Dr. Ewart, of Calcutta, discovered an abdominal swelling which he thought might possibly be early pregnancy, although there had been no irregularity in menstruation. The swelling increased rapidly in 1875, and, when I saw her in May 1876, the uterus was evidently enlarged to the size in the fifth or sixth month of pregnancy. As there were no urgent symptoms, she returned to India, and I did not see her again until May 1877. There had been some slight increase in the size of the uterus, and menstruation was

becoming rather profuse; but she remained in fairly good health till July 1878, when her general health suffered after much anxiety and over-exertion; but she got over this, and went through 1879 pretty well. In June 1880, the tumour having considerably increased in size, Sir W. Jenner saw her with me in consultation as to the question of operation, and it was decided that there should be further delay, but that the tumour should be removed as soon as it became intolerable. Menstruation became still more profuse, size increased, she lost flesh, became unable to take any but very short walks, the feet swelled, and purpuric spots appeared on the legs. In December 1880, at another consultation with Sir W. Jenner, we found a large solid tumour, reaching quite up to the ensiform cartilage, and an ovary could be felt and moved in each iliac region. The uterine cavity was slightly elongated, but I thought the tumour and part of the fundus uteri might probably be removed without opening this cavity. It was agreed that I should attempt to remove the tumour; but that, if the difficulty proved to be greater than I expected, I should then remove both ovaries in the hope of thus leading to atrophic change in the tumour. We waited until after the cessation of another menstrual period, and I then went into Gloucestershire, and operated on Feb. 12, 1881, assisted by Dr. Forty and Mr. Simmons of Wotton-under-Edge, Mr. Wickham of Tetbury, and Mr. A. Grace of Sodbury. Dr. Day administered methylene. After making an incision from two inches above to six inches below the umbilicus in the median line, the enlarged solid uterus was exposed, free from adhesions, but covered by very large veins, and there was no distinct neck to the tumour or fundus. The left ovary was large, and both were easily separable from the tumour. My first intention, accordingly, was to be satisfied with removal of both ovaries, and leave the uterus alone. On drawing up the left ovary, a cyst, or corpus rubrum, in it burst, and much black clot was pressed out. I then transfixed, tied the connecting tissues between the ovary and the enlarged uterus, and cut the ovary away. Very free bleeding followed, and successive ligatures cut through a soft venous plexus. I, therefore, felt compelled to remove the tumour, and, after applying on each side, before and behind, four pairs of large pressure-forceps, I amputated the tumour, cutting through the fundus uteri diagonally from the right Fallopian tube, downwards and to the left of the bleeding surface, where the left ovary had been attached. The uterine cavity was not opened. Part of the fundus and the body left with the cervix were normal in size and consistence. The left Fallopian tube was removed with the tumour. The right remained; and the right ovary, although rather large, was not disturbed. Theoretically, it would have

been better to remove it; but I was very unwilling to prolong a serious operation by anything not absolutely necessary. Several very large arteries and veins were secured, some by ordinary ligature of carbolised silk, some by ligature after transfixing the uterine tissue; and then the peritoneal edges of the divided fundus were brought together by suture. Although a great deal of blood was lost, the lips never lost their colour, and there was no vomiting. The patient was exactly an hour under the influence of the anæsthetic, and Dr. Day told me that he had never given so much methylene before at any of my operations. Nearly two ounces were used. I did not make any provision for drainage, as I had carefully sponged away all blood and clot; and the wound was united in the usual way by silk sutures. Phenolised spray was used, phenolised sponges, ligatures, and instruments, and dry dressing. The tumour was a solid fibroma, with several projections or outgrowths from the peritoneal surface. It weighed 11½ lbs.

The patient was left in charge of Dr. Forty of Wotton-under-Edge, and recovery was uninterrupted by any bad symptom. The temperature reached 101°, and the pulse 104, on the third day; but the convalescence may be said to have been without fever. I saw the lady in London on April 28, quite well, and with nothing but the linear cicatrix in the abdominal wall to be detected as showing that there had ever been any disease of the uterus. The cervix was mobile, and nothing abnormal could be discovered anywhere. The catamenia appeared quite as usual the first week in May, after an interval of three months, and passed off quite normally.

These are all the cases in which I have removed uterine tumours entirely since August 1880, and all have recovered in the most satisfactory manner. In three other cases, I made simple exploratory incisions; doing nothing more, as the difficulties of removal appeared very great. One patient died a week after the incision, of peritonitis. The other two were neither better nor worse for the incision. In another case, a patient of Dr. Andrews of Hampstead, a single lady, aged 60, I was only able to remove part of a fibroma, after emptying a large cyst-like cavity. The patient died on the third day. And, in one other case, a patient of Dr. Monro of Newtown, Montgomeryshire, where I could only remove a projecting outgrowth from the main part of the tumour, the patient, who was in an extremely feeble condition before operation, died on the eighth day.

I feel very hopeful that, by the use of the improved pressure-forceps, the arrest of hemorrhage will be effected much more easily and completely than before; that suture of the uterine wall will obviate more than one source of danger; and that,

by careful attention to all needful antiseptic precautions, the removal of uterine tumours may now be undertaken with a far more confident expectation of a successful result than could have been reasonably entertained a very few years ago.—*British Medical Journal, June* 11, 1881, *p.* 909.

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## 72.—ON THE SYSTEMATIC TREATMENT OF NERVE PROSTRATION AND HYSTERIA CONNECTED WITH UTERINE DISEASE.

By W. S. Playfair, M.D., F.R.C.P., Professor of Obstetric Medicine in King's College, London.

I am anxious to bring very briefly under the notice of the profession in England a method of dealing with certain grave and most intractable forms of nervous disorder familiar to all who see much of the diseases of women, which I first became acquainted with through the study of a remarkable and interesting little work by Dr. Weir Mitchell of Philadelphia, entitled "Fat and Blood, and how to make them." In doing so I have no original contribution to medical science to make; I have simply followed Dr. Mitchell's directions, but with results so astonishing and satisfactory to myself, in cases which were quite heart-breaking from their obstinate resistance to all ordinary management, that I am confident I shall be doing the profession a service if I can secure for Dr. Mitchell's plan, which is based on sound theory and accurate clinical observation, a more extended trial than it has as yet received. I am the more encouraged to do this since Dr. Mitchell informs me that he is not aware that his principles of management have hitherto been tried at all in England, although well known in America. "Here," he writes to me, "the treatment has rescued hundreds of women, and is used by men like Perry and Goodell with increasing confidence. I hope at some time to write for some English journal a *résumé* of the treatment, but it were far better done by one like you, who could quote cases of success in England."

Pending Dr. Mitchell's promised contribution, which will, I am sure, be read with interest, I may, at least, try to prepare the way by the recital of a few of the cases in which I have found his plan so useful.

The class of cases referred to is not easy to define or describe accurately, and yet they must be perfectly familiar to all. I have called the condition, in the heading to these notes, "Nerve Prostration and Hysteria connected with Uterine Disease." Goodell, who has an interesting chapter on the subject in his "Lessons on Gynecology," heads it, "Nerve-tire, or the Relations of Neurasthenia to Diseases of the Womb." The

protean symptoms we have to deal with are such as gradually develop themselves in those confirmed invalids who are so widely scattered over the country, who have been from one doctor to another, subjected to all sorts of uterine medication, mechanical and other, with no lasting improvement, until eventually they become bedridden, or nearly so, sleepless, victims to chloral and morphia, worn and wasted, and burdens to themselves and their families. Now, in a large number of these cases there is, or has been, very real uterine mischief. I shall not be accused, I am sure, of any disposition to minimise the influence of local uterine disorder on the general health. As a matter of fact, however, many of these cases have drifted far beyond the point at which local treatment, however judicious, is capable of effecting a cure. The pain, the backache, the leucorrhœa, the difficulty in progression, the disordered menstruation which are attendants on the local troubles, have ended in producing a state of general disturbance in which all the bodily functions become implicated. The nervous system is profoundly affected, the blood impoverished, and the general nutrition at the lowest ebb.

I shall not attempt here to explain the pathology of this state, but rather to describe the class of case, which, however, all my readers will at once recognise. Such cases have two or three prominent symptoms in common, among the most marked of which are wasting of the fatty tissues, combined with anæmia, the patient having gradually lost all appetite, professing a total inability to take a healthy amount of food, and often consuming barely enough to support vitality. Associated with this are very marked dyspeptic symptoms, too often aggravated by the pernicious habit of deadening pain by chloral, morphia, or stimulants. As a necessary consequence of such a state, and partly no doubt from local pain, all exercise is abandoned, and the patient becomes entirely confined to the house, or even to bed. Another group of symptoms which soon show themselves under such conditions are those of a moral character, the patient becoming emotional and hysterical, constantly craving for sympathy, which she often obtains to a degree most prejudicial to her welfare, until at last the whole household becomes victimised by the morbid selfishness thus developed. Every practitioner must know of cases of this kind, and must be familiar with the useless endeavours at cure which have been made by tonics, water cure, and a hundred other plans, each of which has proved equally unsuccessful.

It is in such cases that Dr. Mitchell's method is applicable, and it is based on the principle, which must be admitted to be perfectly physiological and reasonable, of removing the patient from the unwholesome moral atmosphere in which she has been

living, combined with the renewal of her vitality by excessive feeding, which, under ordinary circumstances, could not be assimilated, but which is rendered possible by passive muscular exercise obtained through the systematic use of shampooing and electricity. At first sight this sounds, perhaps, chimerical; and, had I not myself witnessed the astonishing success which followed its use, I would doubtless be as sceptical as others may be as to its value. I propose, however, to relate the first four cases in which I have followed Dr. Mitchell's method, each of which had been for years in a state of hopeless misery, subjected to all sorts of treatment in vain, and I trust that the simple narration of these remarkable cases, which are not selected, but are the first which have come under my observation, may secure for this rational treatment a fair and extended trial. Before relating them, however, I shall shortly describe the method of treatment I used, and in doing this I merely paraphrase Dr. Mitchell's directions. I must necessarily be extremely brief, and I must refer those who are disposed to try it to Dr. Mitchell's book, in which full details for their guidance will be found. The plan involves four principal heads, each of which I shall refer to separately.

1. *Seclusion and Rest.*—An important element in the treatment, and one which, from what I have seen of these cases, I believe to be absolutely indispensable, is the entire seclusion of the patient under a competent nurse, and her removal from the morbid atmosphere of invalid habits, which has gradually grown up around her. Unless the patient is entirely removed from the injudicious sympathy and constant tending of her friends, it will be next to impossible to gain that moral influence over her which is really essential to success. This is a point which involves so severe a strain that it may be found very difficult to obtain the consent of the patient and her friends to a measure which will seem to them so harsh and strange. I do not think, however, that any compromise on this point should be admitted, and if it be found impossible, from domestic reasons, to secure the removal of the patient from her house, it should, at least, be made an absolute *sine quâ non* that she should be placed in a separate room with her nurse, and that she should not be visited by any one except her medical attendant. On this point Dr. Mitchell's experience is worthy of note. "I have often," he says, "made the effort to treat these cases in their own homes, and to isolate them there, but I have rarely done so without promising that I would not again complicate my treatment by such embarrassments. Once separate the patient from the moral and physical surroundings which have become part of her life of sickness, and you will have made a change which will be, of itself, beneficial, and will

enormously aid in the treatment which is to follow." The first step on commencing, is to place the patient at rest in bed. It will readily be understood that this absolute repose is only intended as a temporary resource, until, by the means presently to be described, the nutrition is improved, and new tissues are built up. Space will not permit of my following Dr. Mitchell in his explanation of the manner in which this proves serviceable;; but, independently of the physical benefit in patients apt to suffer from exhaustion on the slightest fatigue, there is a distinct moral gain. "From a life of irregular hours, and probably endless drugging, from hurtful sympathy and over-zealous care, the patient passes to an atmosphere of quiet, to order and control, to the system and care of a thorough nurse, to an absence of drugs, and to simple diet." As a rule, in bad cases this repose in bed is continued during the greater part of the treatment, averaging from six to eight weeks; and at first the rest is made absolute, the patient being only allowed to rise for the purpose of passing her evacuations, and is neither allowed to read, to sew, nor to feed herself. Practically there is so much to do with feeding, massage, and electricity, that this is not found so wearisome as might be supposed; but no doubt, the monotony of the life and the growing strength, which accompanies a satisfactory progress towards cure, tend to make the patient the more willing to throw off her old habits of invalidism when the proper time arrives to make the effort. By degrees the period of repose is lessened, and the patient is gradually made to sit up for several hours, until towards the end of the cure she only rests on the bed for three or four hours daily.

2. *Massage.*—This, combined with faradisation, is a very important part of the treatment, and it consists in systematic shampooing and exercise of all the muscles, both of the extremities and trunk, first for half an hour or so twice daily, but very soon for not less than an hour and a half night and morning. By this means the cutaneous circulation is improved, and the muscles are brought into active exercise without the expenditure of nerve force. To do this effectually considerable experience is required, and although in one or two cases I have had it done successfully by the nurse, it requires so much intelligence on her part, and she is besides otherwise so fully occupied by the rest of her work, that I think it perferable to employ a regular rubber. Full details of the method to be adopted, and the best way of exercising the various groups of muscles and the joints will be found in Dr. Mitchell's book. It is surprising how soon the patient comes positively to enjoy a manipulation that for the first few days is very trying. Soon all local tenderness disappears, and a pleasant sense of exhaus-

tion, followed by refreshing sleep, is alone experienced. In two of my cases the abdomen, especially in the ovarian regions, was so tender that the patient at first shrank from the slightest touch, but in a very short time she could be freely handled and kneaded in every part.

3. *Electricity.*—This forms a valuable subsidiary means of exercising the muscles. The interrupted current is employed twice daily from half to three-quarters of an hour. Here, again, some practical skill is necessary, but with a little careful teaching on the part of the practitioner, the use of the battery can be safely and efficiently entrusted to the nurse. The poles, armed with wetted sponges, are placed on the muscles to be operated on in turn, about four inches apart, and slowly moved until the muscle is fully and freely contracted. Commencing with the feet, the whole body, except the head, is thus systematically gone over. There is no doubt that this is painful and disagreeable, but it is of unquestionable utility, especially in cases such as the one to be presently narrated, in which there was long-standing hysterical paralysis, and consequent atrophy from disuse of extensive groups of muscles.

4. *Diet and Regimen.*—These form the most important and most characteristic part of the cure. It is perfectly astonishing how, under the conditions above described, a pale, anæmic, and wasted invalid, able to eat next to no food, can be brought to consume, and not only to consume but perfectly to assimilate, an amount of nourishment that would appear to be incredible had experience not amply proved the fact, so that she shall gain flesh, weight, and strength so rapidly that the change is almost apparent to the eye from day to day. The first step, after secluding the patient with the nurse, and before the massage is commenced, is to place her on a diet of milk alone, given at intervals of three hours. At first three to four ounces are given at each feeding, but in a couple of days or so the amount is increased to eight or ten ounces, so that within three or four days she is consuming two or three quarts of milk within the twenty-four hours. No difficulty is experienced in getting the patient to take this quantity, and if she suffers, as so many of these cases do, from dyspeptic symptoms, they rapidly disappear. After the first two days, when the stomach is settled, the massage is commenced, and along with it an increased amount of food is administered, commencing with bread-and-butter, an egg, or the like, for breakfast; then, in a day or two, a chop finely cut up, with some vegetables, is given at midday, and so on progressively, until in from ten days to a fortnight three full meals daily are given, besides from a quart to two quarts of milk in divided quantities, and a considerable amount of soup made from raw beef, after a receipt given in Dr. Mitchell's

book. It seems impossible, but it is nevertheless a fact, that under the use of massage and electricity these large amounts of food are taken readily without the slightest feeling of dyspepsia or discomfort. In illustration I copy the food journal on the fourteenth day of treatment of one of my patients, who had been bedridden for many years, and who all that time had existed on a dietary almost as remarkable from its smallness, frequently not taking more than half a tumbler of milk in twenty-four hours, and who could not be persuaded to eat more than one strawberry at a time, as forming a meal too large for her capacity. The treatment was commenced on October 16 with three ounces of milk every third hour. On Oct. 30 this was what she consumed with appetite :—5 a.m. : Ten ounces of raw meat soup.—8 a.m. : Cup of black coffee.—9 a.m. : Plate of oatmeal porridge with a gill of cream and a tumbler of milk.—12.30 : Milk.—1.45 p.m. : Whiting, bread-and-butter, rump-steak, cauliflower, omelette, and a tumbler of milk.—4 p.m. : Milk.—5 p.m. : Milk and bread-and-butter.—7 p.m. ; Fried haddock, chicken, cauliflower, apple and cream, and a glass of burgundy.—9.30 : Milk.—11 p.m. : Raw meat soup. (The milk between 8 a.m. and 9.30 p.m. amounted to two quarts.) Nor is this exceptional. In every case I have treated on this plan similar amounts of food were taken, and with the same advantage. Of course, certain difficulties are apt to be met with, but only in one of my cases was any nausea or oppression experienced from the administration of this apparently excessive diet, and in that I attributed the sickness rather to too sudden an attempt to stop the hypodermic injection of morphia the patient had been accustomed to than to the feeding. At any rate, should sickness supervene, a temporary return to milk alone for a day or two will be sufficient to settle the stomach.

I have only attempted to sketch, in very rough outline, the principles on which the treatment is conducted.—*Lancet, May* 28, 1881, *p.* 857.

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## 73.—ON THE TREATMENT OF PUERPERAL CONVULSIONS BY HYPODERMIC INJECTION OF MORPHIA.

By S. Maberly-Smith, Resident Surgeon at the Lying-In Hospital, Melbourne, Victoria.

Having found the usual treatment for puerperal convulsions, by chloral, bromide of potassium, bleeding, and chloroform, very unsatisfactory, by the advice of Dr. Fetherston I tried hypodermic injection of morphia. The result has been very successful in my own hands and in others'; and as I believe this plan of treatment is not generally adopted I bring it under notice. From fifteen cases treated in this manner in the Mel-

bourne Lying-in Hospital, and by gentlemen outside, I have come to the following conclusions.

The quantity of morphia to be injected is from one-fourth to one-third of a grain, according to the severity of the case. The simple solution of morphia is more efficacious than morphia and atropia combined; one large dose is better than two smaller ones.

Patients suffering from puerperal eclampsia, whether sensible or insensible, appear to resist the dangerous effects of the drug; it seems to have no bad consequences in cases in which, under ordinary circumstances, morphia would be strongly contra-indicated. I have injected the solution in women who were insensible with stertorous breathing, congested lungs and faces, and contracted pupils, in every case with the best result.

After injection the patient may have one fit before the drug has had time to act, but never has another for hours, provided that the injection is proportionate to the severity of the attack. If at the end of some hours the patient has another fit it is generally a slight one, and a smaller injection than the first should be given. No case of puerperal eclampsia has died in the Melbourne Lying-in Hospital since this treatment has been adopted. Several of the patients so treated were as bad as it was possible for them to be, and would, I am convinced, have died under any other form of treatment.

The following are short notes of the last five cases of puerperal convulsions admitted into the Melbourne Lying-in Hospital.

*Case* 1.—M. B., had four severe fits before delivery. The urine contained a trace of albumen. One-third of a grain of morphia was injected. There were no more fits. Delivery was accomplished naturally. Perfect recovery.

*Case* 2.—M. T., had a natural confinement; one hour after delivery patient was seized with convulsions, and had three in rapid succession; the last was so long and severe that the nurse thought that she was dead, and she certainly very nearly was. I injected one-third of a grain of morphia; convulsions ceased and never returned; urine contained a considerable quantity of albumen.

*Case* 3.—B. M., had five convulsions on the way to hospital. When admitted was insensible, with stertorous breathing, contracted pupils, and very weak pulse; no power over sphincters; very little albumen in urine; labour commencing. One-third of a grain of morphia was injected; no more fits for seven hours, then had a slight one. A quarter of a grain of morphia was injected; four very slight fits two hours after. Delivery accompanied with long forceps twelve hours after admission,

patient being still insensible and very low. After delivery a quarter of a grain of morphia was again injected; two very slight fits seven hours after last injection; patient had no more and made a rapid recovery.

*Case* 4.—C. G., six months pregnant, had seven fits in two days previous to admission, for which one-fifth of a grain of morphia with atropia had been injected twice at intervals of eight hours. This lessened the force of the convulsions, but did not stop them. Immediately after admission the patient had a severe fit. One-third of a grain of morphia injected; no more fits; delivered naturally; good recovery. Urine was loaded with albumen.

*Case* 5.—K. K., had a natural labour, but before the placenta was expelled was seized with a very severe convulsion, followed by two others equally bad. One-third of a grain of morphia injected. A few minutes after had a worse fit than the former ones. No more for eleven hours, then two, not so bad as the former ones. One-third of a grain of morphia again injected, after which she had no more, and made a good recovery. Urine contained a trace of albumen.—*Lancet, July* 16, 1881, *p.* 86.

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## 74.—ON MALIGNANT PAPILLARY DERMATITIS OF THE NIPPLE, AND THE BREAST-TUMOURS WITH WHICH IT IS FOUND ASSOCIATED.

By George Thin, M.D., London.

A considerable number of cases have been published, during the last few years, in which an obstinate affection of the skin of the areola and nipple had preceded the development of cancerous tumours of the breast—the coincidence having been first observed and described by Sir James Paget. The nature of the affection of the skin, and the pathological significance of the structure of the breast tumours, having given rise to questions regarding which unanimity has not been attained, I believed it would be useful to show, at the meeting of the British Medical Association at Cambridge, the preparations which had suggested the opinions explained in a paper on the subject, read before the Royal Medical and Chirurgical Society during the preceding session of the Society.

The preparations were obtained from four cases. In all the four cases, the changes in the skin showed the same pathological condition; but the tumours were in no two instances exactly alike. They agreed in being examples of a variety of breast tumours which, I think, will be most conveniently known as duct-cancer. None of them were scirrhous tumours (in the true pathological sense, as equivalent to parenchymatous cancer—the cancer which develops from the secreting epithe-

lium of the acini). In certain points, they agreed in structure; and these were points which they had in common with tumours which are often described in England as adenomata, or adenoid tumours.

Opinions regarding the exact nature of this class of cases, and the connection which they have with the duct epithelium, will probably vary considerably until full details regarding a considerable number of them have been published. Concerning the nature of the breast tumours, more particularly, opinions will differ on account of the opposite stand-points from which pathologists look at morbid growths of the mammary gland, and also on account of the somewhat confusing effect of the want of a settled nomenclature.

*Case* 1.—This case was that of a woman, aged 33, the mother of children, a patient, under the care of Mr. Henry Morris, at the Middlesex Hospital. The breast was removed in March 1879, and contained several nodules of recent and rapid growth, which were diagnosed as cancerous. The superficial disease had begun on one point of the nipple, from which it slowly spread, and had existed from four to five years before any tumour was felt in the breast. I had an opportunity of preparing for examination the breast, the skin, and several cancerous glands from the axilla, immediately after their removal.

The epidermis was much broken up and disintegrated. A thin remnant of the horny layer, uneven and ragged, lay on the surface of the diseased skin. Below this thin strip of dead epidermis, the contour of a thickened rete mucosum could mostly be distinguished, although, at some parts, it was impossible accurately to define the deep border where it was in contact with the subjacent mass of cell-infiltration; but, even where the rete mucosum maintained its outlines, so many of the constituent cells had perished that the structure existed only in skeleton form. Many cells haddisappeared entirely. Of those which remained, a great number showed the usual stages of cell-degeneration—namely, a swollen nucleus, disappearance of the nucleus, and swollen or vacuolated cell-substance, enclosing an altered nucleus or the cavity from which it had disappeared. This condition pervaded the entire thickness of the rete. At other parts the destruction of the epidermis was even more advanced, the thin ragged horny layer covering a kind of granulation tissue, in which isolated islands of diseased epidermis were present.

Beneath the diseased rete mucosum, the connective tissue of the papillary layer had undergone extensive changes. In the part nearest to the healthy skin, a considerable amount of cell-infiltration existed amongst the bundles; but, nearer to the nipple, this cell-infiltration became extreme, and occupied the

position of the bundles of the white fibrous tissue. The normal bundles of the part had disappeared, and in their place (in so far as the mass of cell-infiltration permitted anything to be seen) an amorphous granular substance was found.

In striking contrast to the condition of the *pars papillaris* (superficial layer of the corium), the bundles of the *pars reticularis* (the strong deeper layer of the corium) were found unaltered, although, between the more superficial bundles of this part of the cutis, there was a certain amount of cell-infiltration.

These changes indicate a morbid process, in which the rete mucosum and the papillary layer of the skin have undergone almost complete destruction; and although, in perhaps both these structures, and certainly in the rete, a certain amount of vitality still existed, yet no signs of a reparative action were detected in either of them. A remarkable feature is the undisturbed condition of the tissues of the skin beneath the papillary layer.

The description which has just been given is sufficient to show, that the peculiar position with which we are dealing in this case is not eczema (the name by which in these cases it has been usually designated); and this is still more clearly shown by examining the part of the section which separates the sound from the unsound tissues. The line of demarcation is indicated sharply by the projection downwards into the cutis of a rounded wall of epidermis, on the further or healthy side of which the cell-exudation ceases. The epidermic cells of this bounding wall are, many of them, diseased (swollen, vacuolated, disintegrated); but, beyond it, the epidermis presents a normal appearance. This condition of the epidermis contrasts with the changes described by Biesiadecki as characteristic of eczema. (It is superfluous to remark that, in eczema, there is no destruction of the white fibrous tissue.) Superficially, the nipple was affected similarly to the surrounding skin.

Transverse sections, through the deeper parts of the nipple-tissue, showed that some of the lactiferous ducts were diseased. The diseased ducts were distended by an accumulation of cells, which, by the action of hardening fluids, had become agglutinated into a mass, only the outlines of the nuclei being distinct.

In one section I found that four finger-like columns of this cell-mass had broken through the wall of the duct, and advanced into the elastic layer, by which, as Henle has shown, the large ducts are surrounded.

The cells in these advancing processes were similar to those which filled the dilated duct. The nuclei were small, fairly uniform in size; and the protoplasm of the cells so feeble in

resisting the action of hardening fluids, that the outlines of the individual cells were rarely to be seen. The contours of these outgrowths from the ducts were well defined.

In some sections, there were found in the elastic layer groups of cells similar to those which blocked up the distended duct. The appearance was the same as might be expected if we imagine that the finger-like processes already described had changed their direction of growth, and turned downwards towards the deeper parts of the breast.

These appearances show that there is an abnormal growth of epithelium into the lumen of some of the ducts, and that there are points where this growth extends outwards beyond the duct-wall into the connective tissue of the nipple; the further development of these outgrowths taking place in a direction parallel to the duct and downwards into the gland. The epithelial character of the outgrowths is everywhere maintained.

An examination of the nodules in the breast showed that the epithelial growth was developing in two ways. Within the area of a lobule, it was found as an enlargement of its ducts and vesicles. This enlargement was produced by a gradual increase in size of the tubes, which became filled with newly formed epithelium. As these columns of cells enlarged, the connective tissue between them disappeared until the circular walls of the growing masses touched. The membrana propria at the point of contact then gave way and disappeared, and the masses coalesced. The columns of cells thus formed retained the tendency to roundness; and, as the coalescing process extended, the area of a lobule was occupied by a few large circular masses. These columns of cells were sometimes hollow, and formed tubes. Sometimes they were filled with cells or cell-*débris*. In many instances, at least, the hollow space in the tube was formed by the disappearance of the *débris*. Sometimes a large cell-column was found filled with it. This *débris*, which is a product of cell-degeneration in its final stages, is a compact granular mass, showing no trace of cell-structures, and stains deeply with eosin. In appearance, it sometimes resembles blood-coagulum, for which, when found in tumours of this kind, I believe it is sometimes mistaken. The distinguishing features in these cell-columns were their roundness, their tubular formation, the frequency with which a membrana propria could be detected, and their comparatively little tendency to destroy the connective tissue. The soft connective tissue of the lobules speedily disappeared; but the firm interlobular tissue of the breast was more resistant, and the cell-blocked areas were found encapsuled by a strong layer of fibrous tissue. This feeble tendency to invade the connective tissue, which characterised the epithelial growths in this

tumour, contrasts with the rapidity with which the cell-growth in parenchymatous (scirrhous) cancer infiltrates the connective tissue of the breast.

But the growths were not all in lobule-areas. We have seen that a new epithelial growth from the ducts in the nipple penetrated the connective tissue, and gave rise to newly formed cell-columns. Areas of cell-growth of a circular form, which were entirely of new formation, were found in the nodules. The cell-growth in these cases consisted of narrow columns of a few cells—sometimes only one cell—in depth. These columns rapidly multiplied within the area, and finally coalesced, again giving rise to a more or less circular mass, surrounded by a comparatively normal connective tissue.

The round cell-masses formed by the coalescence of the intralobular growths, or by the new extralobular formations, usually showed little tendency to invade the surrounding tissue. They were often represented in sections by rounded holes, entirely or partly empty of epithelium. These rounded cell-masses grew larger by the accretion of a new layer of cells on the periphery. This new cell-formation was foreshadowed by a change in the surrounding connective tissue; in stained preparations, a deeply tinged curve of fibrous tissue being sometimes found in a position corresponding to the new layer of cells observed in other sections. The cancerous formation in the axillary glands was found as rounded cell-columns having a distinct contour. The outlines of the individual cells could be seldom made out.

*Case* 2.—I am indebted to Mr. George Lawson for the opportunity of investigating another case in which the appearance described as "eczema of the nipple" preceded the development of a cancerous tumour in the mammary gland.

The patient, a widow, aged 52, had been four years under treatment for the so-called eczema. Mr. Lawson, who examined the breast in the summer of 1878, after the skin-affection had lasted three years, satisfied himself that there was at that time no breast-tumour; but when he next saw the patient, in July 1879, a year afterwards, a tumour of considerable size was detected. The breast was then removed.

The diseased portion of skin was oval in form, and had a distinct well-defined border. It measured two inches and three-quarters in its long, and two inches in its short diameter. The nipple, which was small and depressed, was situated excentrically in the oval.

The diseased area was rough, and covered with uneven epidermis; the roughness almost amounting occasionally to a warty condition. The border of the area was raised, and at some parts it distinctly overlapped a slight sulcus which formed the line which separated the healthy from the diseased skin.

Microscopical examination showed a condition of the skin similar to that which was observed in Mr. Morris's case. In the diseased area, the epidermis was broken up, but still existed as a covering for the cutis. As compared with that of the adjacent sound skin, the epidermic membrane was thicker towards the border of the area, the interpapillary processes having become longer and broader than in the normal skin of this part. The cells of the rete mucosum were found in various degrees of degeneration; and many of them had disappeared, leaving a vacuole in their place. A fairly compact thin border of the horny layer covered this broken-down Malpighian layer. The diseased rete was sharply defined towards the healthy epidermis by a groove which corresponded to the sulcus seen in the skin of the breast, the degenerative changes extending to the border of the groove. The deep broad mass of epidermis, which separated the healthy from the diseased area in Mr. Morris's case, did not exist in this one, at the part which was examined.

The bundles of connective tissue in the *pars reticularis corii* were normal; but, in the *corpus papillare*, changes similar to those described in Mr. Morris's case were found. The fine bundles of the papillary layer must have been to a great extent destroyed as their place was occupied by a dense mass of exudation-cells. Towards the healthy skin, this mass became less dense, connective-tissue elements being mixed with the cell-infiltration. In the diseased or nipple-border of the part I examined (which was from the external portion of the area), this cell-mass touched the broken epidermic cells of the rete mucosum on the one side, and the large, strong bundles of the *pars reticularis corii* on the other. Some of the vessels in the *pars reticularis* and in the papillary layer on the healthy side of the groove were surrounded by a narrow zone of exudation-cells; but in neither of these situations were cells found between the bundles.

The epidermis over a small portion of the nipple which was examined showed similar changes to those found in the areola.

The mammary tumour was formed by an epithelial growth which had the following characters. The connective tissue of the nipple was permeated by numerous epithelial columns, mostly several cells thick, almost up to the epidermis. The hard centre of the tumour contained a dense epithelial growth lodged in alveoli; but it also contained epithelial elements arranged in the same manner as those found on the borders of the tumour. It was on the deep edge of the growth, where normal epithelial elements were still found, that a special examination was made, in order to determine the precise relations of the morbid epithelial development to the lobules of the gland. The epithelial growth in this situation, in its final stage,

consisted, as seen in sections, of large circular masses of cells. These masses were surrounded by connective tissue, with which they sometimes seemed to be in direct contact; but sometimes a thin membrana propria intervened between the connective tissue and the epithelial elements. Sometimes one unbroken circle was found alone in the midst of apparently unchanged connective tissue; sometimes a group of three, four, or five such circles were found closely associated. Sometimes, again, a circular bud was found close to a mass; its origin in such cases being explained by sections in which the bud was found connected by a pedicle with a large circle. The features of these groups by which the special character of the tumour is shown are the circular form of the cell-masses, which was comparatively seldom interfered with by epithelial offshoots; the absence of infiltrating epithelial growths in the surrounding connective tissue; and the comparative absence of inflammatory or irritative changes.

The nature of the epithelial element was further illustrated by a special tendency occasionally shown in its development. In some of the round masses, the border-cells were formed by a typical columnar epithelium. The peculiar columnar form of the cells must be attributed to inheritance of the developmental character of the lining epithelium of the lactiferous ducts, as distinguished from that of the secreting cells of the mammary gland.

The origin of some of the spherical masses of cells by a further extension of the adjacent newly formed cell-conglomerations was directly observed; but no less was a primary and other mode of development a matter of direct observation. In this tumour, the development of cancerous epithelial masses from the small or terminal lactiferous ducts could be traced in all its stages. The first stage was the dilatation of the duct of the lobule, attended by the formation of cells in its walls and in its cavity. The dilatation extended downwards until every vesicle had become a tube formed by a double layer of cells; the circle seen in section being twice or three times that of the normal vesicle, the outermost ring of cells resembling in size and arrangement the cells described as subcolumnar in columnar epithelium. In some lobules, the growing cell-columns were more or less solid; whilst, in an adjoining lobule, the development of the epithelial border was attended by a corresponding disappearance of the cells in the centre, giving rise to a group of cystic cavities lined with epithelium. We have thus, in the same tumour, two modes of epithelial development, each of which is sometimes found exclusively in a breast-tumour, but neither of which is found in parenchymatous (scirrhous) cancer.

*Case* 3.—An instance in which a superficial affection of the nipple was followed by a tumour in the breast has been brought under my notice by Mr. Alan Reeve Manby of East Rudham. The patient had always had trouble with the nipple when suckling, the last two or three babies getting "as much blood as milk." In August 1876, what Mr. Manby describes as "the superficial ulceration" caused the patient so much uneasiness as to lead her to seek his advice. At that time, the skin "used to scab and heal." In the spring of 1877, she first noticed a lump, which he removed on April 22nd of that year. At the time of the operation, the woman was forty-seven years old; and the catamenia, though irregular, had not ceased. She died in July 1879, with obscure symptoms of general pain, traceable, Mr. Manby believes, to the fear of a second operation he had suggested some months before her death, for the removal of a line of cancerous nodules recurring along the old cicatrix.

The tumour had been preserved in spirit, and was sent to me by Mr. Manby. On cutting through it, I found that the growth had a circular form, the centre being under the nipple. It had a breadth of about three inches, and a thickness of six-eighths of an inch. It was of a pale pinkish colour, permeated by a network of white streaks of connective tissue, continuous with the connective tissue surrounding the tumour. The pinkish tissue contained a great number of minute cavities, the largest being about the sixteenth of an inch. The cavities were the sections of canals or tubes, which admitted a bristle for some distance. Some of the cavities were empty; others were filled with a plug or mould of the same colour as this part of the tumour. A section through the nipple, which was of the full size, revealed the fact that several lactiferous ducts were filled with the same pinkish substance.

Microscopical examination showed that the surface of the nipple was covered by a ragged, broken-down epithelium, similar to that described in Mr. Morris's and Mr. Lawson's cases. Beneath the epidermis there was also, as in these cases, a dense small-cell infiltration, with partially destroyed connective tissue, large spaces being found between the disintegrated bundles. These changes, which were limited to the epidermis and the papillary layer, were continued only for a very short distance to the skin of the areola, and gradually shaded off into the healthy tissues. The tumour was formed by tubular epithelial growths.

The tubes grew in clusters, and were formed by the coalescence of the smaller tubes which formed the cluster. In the least advanced clusters, each small tube was surrounded by connective tissue. In those which were more advanced, the connective tissue within the zone of growth was partially or nearly entirely

obliterated—the contours of the small tubes being, however, still distinct. In the most advanced stage, the area of the cluster was either filled with a rounded mass of cells or was found empty, the boundary being formed by an even-contoured ring of connective tissue.

These appearances lead me to believe that the growth was another example of the class of tumours to which, in consideration of the epithelium from which they spring, the term *duct cancer* may be appropriately applied.

*Case* 4.—I showed at Cambridge a section from another tumour excised by Mr. Morris, which had been also preceded by this affection of the nipple. An account of the case was read before the Medical and Chirurgical Society on Dec. 10, 1879. (See Medico-Chirurgical Transactions, vol. 63, page 38.) The patient, a woman aged 40, and the mother of children, had suffered from the disease of the nipple for six years before anything was felt in the breast.

This tumour was examined by Dr. Goodhart; and, as a full report by him on its structure is contained in Mr. Morris's paper, it is unnecessary for me to describe it in detail here. As, however, Dr. Goodhart had been so good as give me a portion of the tumour, preserved in spirit, from which I had prepared the section shown at Cambridge, it is of some interest to bring together an account of the four tumours.

The sections show lobulated areas of epithelial growths in the connective tissue. In these lobules, all the stages of the formation of epithelial tubes or cysts, which I have described in connection with the previous tumours, were observed. The larger tubes, formed by the coalescence of the smaller ones, were sometimes found full of agglutinated epithelium, and were sometimes seen as spaces lined by a single layer of cells. In the latter case, the epithelial *débris* had probably fallen out in the preparation. The drawings are sufficient to show that this tumour is not an ordinary scirrhous (parenchymatous) cancer. I believe that it belongs to the same class as the first three cases. An examination of a portion of the diseased skin, which Dr. Goodhart was kind enough to give me, showed similar appearances to those described in the three preceding cases.

The microscopical examination of the skin in these four cases has established one point of great practical importance. The patients suffered from an affection that has hitherto been described as eczema of the nipple. The diagnosis of eczema from the purely clinical side was, I believe, a fair subject of discussion; but I have never been satisfied that the evidence in favour of eczema was convincing. In two cases of the disease, which I have had an opportunity of examining before operation, the clinical evidence was, in my opinion, against eczema, and in

favour of infiltration in the superficial layer of the cutis. The microscopical examination is decisive on this point, and proves definitely that the diseaseis not eczema—the connective tissue in eczema, even in the most severe cases, remaining undestroyed.

The publication of this evidence, in sufficient detail to afford a basis for independent judgment, becomes, therefore, a matter of the first necessity; and, in writing this paper, and in selecting the drawings, I have kept this object in view. Full evidence of the kind, with a detailed account of additional cases, was much to be desired. Instances of the disease are not numerous; but it is to be feared that confusion will arise as regards this affection and true eczema of the nipple. Cases have already been published of a speedy cure of the disease which there is no reason to believe were anything more than simple eczema. When it is considered that the diagnosis of this malignant dermatitis would immediately raise the question of operation—whilst, so far as we know, a true idiopathic eczema need not—it is evident how important it is to collect all available data which may render the recognition of the difference between the two conditions more easy.

The idea that cancer might develop on long-standing eczema has, analogically, much to recommend it. There are well-known authenticated cases of the development of epithelioma in lupus tissue; and the development in cicatrices, and in tissues subject to special causes of irritation—as in the chimney-sweep's cancer, and in cancer of the lower lip in smokers—is well known. All that is wanting to establish a similar fact for eczema is a well-authenticated case; but, common as eczema is, such a case does not seem to have occurred.

In distinguishing, clinically, this malignant dermatitis from eczema, the chief points to be borne in mind are the well defined margin in the former, and the evidence, when the tissue is grasped between the fingers, of infiltration in the papillary layer. An eczema of the areola, that had the thickening and moist redness which have characterised some of the cases of this affection, would be so acute in its nature that the zone of inflammation would pass off gradually into the surrounding skin, would probably become widespread, and would give rise to very active symptoms. The overlapping margin forming a veritable ridge, with a sulcus behind it, which characterised another case, would of itself be sufficient to exclude the diagnosis of eczema. The history of the case may be found useful in establishing the diagnosis. In two cases which have come under my notice, there was clear evidence that the disease began in a position corresponding to the openings of the lactiferous ducts, and remained limited in that position for some time before extending over the surface of the nipple.

This malignant dermatitis has neither the symptoms nor the pathological anatomy of any known skin disease. It is characterised by destruction of connective tissue, and by a permanence of the destructive influence; for repair of the destroyed elements does not occur. In other words, a destroying agent extends from the mouth of the lactiferous ducts into the surrounding papillary layer. The condition of the breast, in the early stages before a tumour can be felt, requires further investigation. In a case, examined and described by Mr. Butlin, in which the breast was removed (Medico-Chirurgical Transactions, vol. 59, page 108) simply on account of the condition of the skin, there "not being at the time of operation any evidence of cancer," the lactiferous ducts were found, "for an inch or more beneath the nipple," completely filled with epithelium. But, from what we know of the slow changes that frequently mark the earlier stages of cancer of the skin (in rodent cancer, for example), there can be little difficulty in accepting it as probable, that cancerous changes are developing in the ducts long before they have given rise to sufficient induration to produce a palpable tumour.

Irreparable destruction of connective tissue of the areola argues, of necessity, in favour of the continued action of a connective tissue poison, if the term may be allowed. Cancerous epithelium—as distinguished from normal epithelium—is such a poison: and the development of malignant papillary dermatitis of the nipple is suggestive of the escape of fluid through the mouths of the ducts, possessing the corrosive qualities which such an epithelium would give it. The hypothesis is confirmed by the subsequent development of palpable cancerous growths in the breast, which are formed by an abnormal development of duct epithelium.

What I believe is most clearly shown, by the preparations and drawings, regarding the nature of the breast tumours, is, that these cases are not cases of ordinary scirrhous or parenchymatous cancer. In all of them the tendency of growth was in round columns, which as they grew larger coalesced into round masses the tendency to penetrate and infiltrate the interlobular connective tissue being comparatively feeble. In scirrhous or parenchymatous cancer, the terminal vesicles of the acini, after they begin to enlarge, rapidly lose their symmetry, and offshoots pierce the connective tissue in all directions. In the tumours which I have been describing, on the other hand, the tendency was to regular symmetrical growth on the circumference, and occasionally to the formation of cystic cavities, by simultaneous breaking down of the central cells. The tendency was more or less pronounced towards the formation of structures that, in England, it is usual to describe as examples of

adenoma. In Case 2, for example, in some parts of the tumour the epithelial growths, consisted of parallel columns (seen in section as groups of circles). A tumour in which the growths were found of this character, and in which, as was the case with some parts of this one, a membrana propria was found enclosing the new epithelial formations, would certainly be considered by many pathologists as "adenoid." The cases described in this paper support the view, that, between duct cancer (fibro-carcinoma cysticum mammæ, Waldeyer), of which they are examples, and the mammary growth known in England as adenoma, the difference is one of degree and not of kind. When an epithelial growth in the mamma takes its origin in the duct epithelium, if the development of columns and tubes is localised and encapsulated by a growth of connective tissue, the ordinary adenoma is produced; if, on the other hand, there is progressive destruction of connective tissue and continued growth, we have a duct cancer as the result. But the stamp of origin in the duct epithelium is always retained; and in some parts of the tumour round-cell masses, with columnar epithelium, will eventually be found, marking the radical distinction between this kind of tumour and scirrhous or parenchymatous cancer. The evidence regarding the nature of the breast tumours associated with disease of the nipple, which has been brought forward in this paper, should be taken in connection with that given in Mr. Butlin's papers in the Medico-Chirurgical Transactions (vols. 59 and 60.) Setting names aside, and examining the drawings with which Mr. Butlin has elucidated his memoirs, I believe evidence will be found that the tumours he has examined, and those which I have described, belong to the same category.—*Brit. Med. Journal, May* 14, 21, 1881, *pp.* 760, 798.

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## 75.—SUGGESTIONS AS TO MODES OF USING THE FORCEPS.

By Henry Lowndes, M.K.Q.C.P.I., Consulting Surgeon to the Liverpool Northern Hospital.

In a long experience of midwifery practice, certain points in regard to the use of the forceps have, by degrees, impressed themselves upon me which I think I may now submit to my medical brethren. Briefly, they are as follow:—1. Traction should be made in the intervals, instead of during the pains. 2. When traction is not being made, the handles of the forceps should be allowed to lie as far apart as they will. 3. During the pains the handles should be merely gently managed, so that they may not be expelled or do hurt. 4. During the passage of the head through the vulva, the forceps should be used, when necessary, as a restraining power during the pains, and labour completed by traction during an interval.

1. That traction should be made during an interval is most important, when we have to use the forceps before the cervix is completely dilated. If we make traction then, during a pain, the blades are tightly compressed between the head and the cervix, and, practically, we are tugging at both the child and the womb. Both the child's head itself, and the cervix itself, must, during the pain, be in a most favourable condition for receiving injury from the blades of the forceps. If regular pains do not exist, I should, as is generally recommended, wait a reasonable time between each act of traction. Again, we all know how, when we are making traction during a pain, with the head high up, the perineum is apt to force the handles forward, and so prevent us from pulling in the axis of the pelvis. By making our traction in an interval, this difficulty is to a great extent removed. Where the pelvis is capacious, and we have only the opposition of yielding structures to overcome, the traction should always be gentle, and may generally be performed with one hand. If it be so conducted, and, as I have ventured to suggest, during an interval, and with a complete relaxation of the handles when they are not being used, and with no more pressure on the handles during traction than is necessary to prevent slipping, then we need not fear injury to the head, or to the mother, even in very protracted cases. In two recent cases in primiparæ, where the membranes had ruptured at the beginning of labour, I made traction with the forceps for considerably more than an hour, with hardly an indication on either head that instruments had been used.

2. In the second point I have mentioned above, there is no novelty, but it is a thing apt to be imperfectly carried out.

3. The third point arises naturally from the first one.

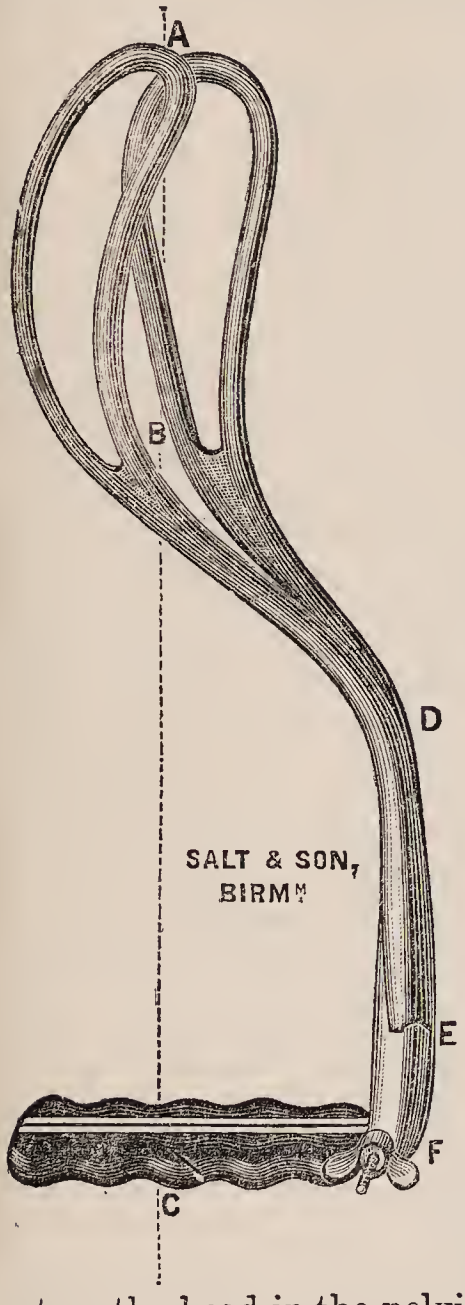
4. It is in cases where we have to do with a damaged perineum, where perhaps there has been loss of substance imperfectly remedied by operation, that we find the value of the forceps as a restraining power. Here the head passing out of the pelvis may be propelled violently by the natural efforts and destroy everything; but if the forceps are used, it can be held back, in a great measure, during the pains, and gently and safely drawn forward during the intervals. A case occurred to me some time ago, in which by these means and the induction of premature labour, a viable child was born without injury to a very imperfect and rudimentary perineum, which, although but frail, was the skilled work of an able surgeon.

In all cases of first labour, when the forceps is used at all, the same mode of treatment is expedient. — *British Medical Journal, July* 9, 1881, *p.* 46.

## 76.—NEW AXIS-TRACTION FORCEPS.

(Manufactured by Messrs. Salt and Son at the suggestion of Dr. VERE G. WEBB, Coleshill.)

"I wish to bring under the notice of the profession a modification of Sir J. Simpson's long forceps, which I think will be found to combine the advantages of ordinary long forceps and the axis-traction forceps, designed by Tarnier and others. The modifications are:—1. A curve four inches below the fenestrum (point D in accompanying diagram), which brings the shanks of the forceps parallel to the line A B C, which represents the axis of the sacral curve; 2. The handles of the forceps, which commence an inch-and-a-half below the lock (E)—which is the ordinary English lock—are bent at right angles to the shanks, and consequently cut the line A B C at right angles; 3. At the point F, the angle between shanks and handle, both blades are perforated; and when the forceps is locked, a steel pin with screw and nut is passed through them to keep the handles together, as shown in the diagram.




The advantages I claim for this forceps are these: 1. They are applicable in all cases, whether the head be at the brim, in the cavity, or at the outlet of the pelvis. 2. When the forceps are applied, the line A B C before mentioned represents the axis of the part of the pelvis where the fœtal head is; consequently if traction be made at right angles to the handles, the power will always act on the head in the pelvic axis. 3. The advantage of pulling in the pelvic axis is gained without any additional rods, whether fixed or movable; consequently the instrument is simpler, lighter, and easier to apply than Tarnier's or other forceps with those additions. 4. The cost is only slightly in excess of that of ordinary long forceps.

The instruments have been made for me by Messrs. Salt and Son, Birmingham, whose name is sufficient guarantee of the excellence of the workmanship."—*Brit. Med. Journ.*, *Oct.* 1881.

# ADDENDA.

## 77.—ON THE VIS MEDICATRIX NATURÆ IN THE TREATMENT OF WOUNDS.

By J. C. Ogilvie Will, M.D., F.R.S.E., Aberdeen.

For several years my efforts have been concentrated in an endeavour to procure what I regard as the perfection of treatment of cases submitted to operative interference—viz., absolute rest of the parts in order that the *vis medicatrix naturæ*, which is all-potent, may proceed uninterruptedly. Let us, then, consider in what unrest consists, and how it may be best avoided. Movement of the limb or other part operated on during the application of dressings is the most apparent factor in the production of unrest, and the presence of foreign matter within the wound is another; and if we succeed in preventing the latter, the necessity for the former will not present itself. We must therefore, in the first place, endeavour to perform our operations in such a manner as to leave the cut parts in the most favourable positions for taking on healing action; and with this in view, carefully carried out designs in operating will materially assist us, so that tension on the flaps, when they are brought together, may be avoided. All bleeding vessels should be secured, lest the formation of a blood-clot may cause separation of the deeper parts of the wound; adequate drainage, to permit of the ready escape of the discharge, must be provided; and accurate coaptation of the cut edges should be obtained. But even if you attend to all these points, no certainty will follow your efforts unless you take means to prevent the access of the putrefactive germs, with which the atmosphere is loaded, to the cut surfaces, or unless you adopt measures to render them inert before they settle on them. You must therefore carry out Listerism in its utmost detail; and I hope to be able to show that, although increased trouble and complicity have been arraigned as witnesses against its employment, your adoption of it will result in an actual saving of trouble to yourselves, and, what is of far greater moment, in a diminution of suffering to your patients. [Prof. Lister's method was fully described and demonstrated.] Such, then, gentlemen, is the mode of carrying out Lister's treatment, and such is the meaning of the different procedures he adopts. The method appears somewhat complicated, but a little practice and much

faith make it easy, and, although the expense of the dressings has been urged as an objection, it is really cheap in the long-run.

In addition to the objections already mentioned I may tell you that the utility or uselessness of the spray is at present a matter of hot dispute. Some German surgeons—among whom Prof. Trendelenburg of Rostock, who recently paid us a visit, leads the van—regard it as unnecessary; but if we base our treatment upon the germ theory of putrefaction the spray is a necessity, and if we disregard it the basis on which Listerism is built must fall, and the removal of each little item of which the superstructure consists will be but a matter of a short space of time. There is, however, one valid objection to its employment—viz., that carbolic acid, like nearly every other antiseptic substance, is an irritant, and that it may occasion antiseptic suppuration; we should therefore use the spray as seldom as possible. But let me not be misunderstood: I do not mean that the spray should not be used on each occasion of exposure of the wound, but that the dressings should be removed as infrequently as is compatible with safety. Here your guides will be the condition of the temperature and the escape of discharge. If the temperature rises you must remove the dressings for the purpose of discovering the cause of the thermal increase, and if discharge issues through the edges of the external dressing you must apply a fresh layer, lest the putrefactive germs may gain access to the wound. If there be evident pyrexia you must uncover the wound; but in the case of mere escape of aseptic discharge the renewal of the external dressing, leaving the deep one untouched, is all that is required. I may remind you that by the term deep dressing is meant the loose pieces of gauze which are applied over the protective, and which are retained in position by means of a gauze bandage, while the external dressing consists of eight folds of gauze, between the two outermost layers of which a sheet of waterproof material is interposed. For the purpose of preventing the latter dressing from slipping, gauze bandages saturated with gum are employed. By restricting yourselves to the removal of the external dressing alone you avoid disturbance of the healing process in more ways than one; for, however gently you may carry out your proceedings in exposing the wound, interference with that part of the dressing which is in contact with it is inevitably attended by pain and involuntary muscular contraction, which tend to disturb the union of the parts; and further, the wound is not subjected to the action of the carbolic spray, which is, as I have just now said, an irritant. Infrequent dressing is therefore our aim, so that unrest may be avoided, and perfection will be obtained when we are able to

leave the dressing, which we apply on the operating table, untouched until cicatrisation is complete. In the case of most major operations that goal has not been reached, but we are almost within sight of it, and if the adage that "straws show how the wind blows" holds good in surgery, our experience in minor operations performed on Listerian principles would teach us that this most coveted result is attainable. In proof I could relate to you the particulars of many cases of minor amputations where the original dressings were allowed to remain untouched for ten or twelve days, and where, on their removal, cicatrisation was found to be perfect; but this has come to be regarded as such a common occurrence, that I should only be occupying your time unnecessarily were I to do so, and as I have cases of greater moment to lay before you, I may at once pass on to them.

And I would first call to your remembrance the case of C. J——, aged twenty-one, on whom Chopart's amputation was performed on Feb. 28, 1880. The operation was performed under spray in the usual manner; wire and catgut sutures and two stitches of relaxation were inserted. The external dressing was renewed on three occasions, but with the exception of making a small opening through which the drainage-tube was withdrawn on March 4, the deep dressing was left untouched until March 6, when, on the exposure of the stump, it was found to be soundly healed throughout its entire extent, excepting at the point where the tube had lain, and even at this point cicatrisation was far advanced. The catgut stitches were all quite loose, and some of them came away with the protective, while the rest of them were readily brushed away with a sponge. The silver wire sutures, instead of being buried in the soft parts, as they would have been had there been swelling of the edges, would have permitted the passage of a fine probe through their loops; but this was not due to their having been freed by ulceration, but to shrinking of the parts through which they had been passed, and on their removal a series of little holes, such as you would make were you to perforate a card with a pin, alone remained to mark the points of entrance and exit. The wires attached to the buttons were relaxed, and the skin upon which the buttons had rested was perfectly normal in its appearance. The protective was moistened with serous discharge, but there was no sign of pus. The highest temperature noted was 99·2° F.

Such a result as this in the short space of one week in the case of an amputation where the flap has a strong tendency to retract, and where, from its nature, it is not easy to maintain exact coaptation, is certainly eminently satisfactory, for we may say that union was practically completed under a single

dressing. In connection with this case I desire to direct your attention to the subject of wound-drainage. The means employed for this purpose are (1) india-rubber tubes, (2) catgut, (3) horsehair, and (4) decalcified bone-tubes. The first is perfectly efficient, but it is objectionable, as the removal of the whole dressing is called for, even when there is neither pyrexia nor soakage in order to shorten or remove the tube. In the case just narrated I was able to extract the tube by making an opening through the deep dressing, but this is ofttimes impossible, and it is annoying to have to uncover the wound for the purpose indicated. To overcome this difficulty Mr. Chiene proposed the use of absorbable drains formed of a number of threads of catgut which, acting by capillary attraction, would serve to remove the discharge. The suggestion was an admirable one, and I have had excellent results by its use, and in minor operations I always employ it; it is open, however, to the objection that the drain becomes absorbed before the wound is in a fit state to dispense with drainage, but with the introduction of chromic catgut this drawback will probably disappear. Horsehair drains are employed, but they, like the india-rubber tubes, are not absorbable, and are open to similar objections.

When Neuber introduced decalcified bone-tubes, prepared by immersing bones in hydrochloric acid, it seemed to me that the desideratum had been supplied, for the animal matter of which they are composed is capable of absorption, but unfortunately my experience of them does not justify me in recommending them, for in some cases they collapse too soon, while in others they remain almost unchanged for a long period. I here show you a tube taken from an aseptic amputation of the thigh twelve days after operation, and if you will examine it you will perceive that, although the end which lay in the deep part of the wound is frayed and irregular, the tube as a whole has not undergone much change; and this other one, which was extracted ten days after operation, is only superficially eroded. Now, had I permitted them to remain until their solution was complete, supposing that the changes in the tubes proceeded at the same rate during the later as it did during the earlier periods, the healing process would have been unduly delayed by their presence; and as this seems to be a common experience, although some surgeons have reported excellent results from their use, I must confess that the opinion I have formed is not a favourable one, and the results I have myself obtained do not encourage me to continue their employment.

But as I may seem to have lost sight of my text, let me lay before you the history of the case of amputation in the thigh. The disease for which the removal of the limb was put in force

was extensive chronic osteo-myelitis, involving the femur and bones of the leg. In selecting the form of operation to be adopted, I was guided by the desire to leave the patient as long a stump as was compatible with the removal of the whole of the affected structures, and to obtain one which would bear the pressure of an artificial limb well. As the soft parts were not implicated, I took a long flap from the front of the knee-joint and leg, performing the operation after the manner devised by the late Mr. Teale, for which I have a decided preference when I can employ it without, as in this case, any undue sacrifice of parts, as I have found, and I have now had a considerable experience of it, that the stumps resulting from amputation by rectangular flaps, or at any rate by a long anterior flap, are far more satisfactory than is the case with any other, for the cicatrix is well out of the way of pressure, and the bone has a soft cushion on which it rests with safety and comfort. The stump was dressed on the following day, and from that time the deep dressing was left undisturbed for ten days, when union was found to be complete except at the point of emergence of the drainage-tube, which was forthwith removed, and not again reinserted. The silver wire sutures, seventeen in number, were withdrawn, as was also the stitch of relaxation. The superficial catgut sutures were, as in the previous case, mostly quite loose, but in the case of a few of them they were still attached by much attenuated loops, the absorptive process being not yet complete. The union was so perfect that I felt justified in thus removing all the stitches, although their presence was unattended by any irritative process, and leaving the stump without any support, except that afforded by the gauze dressings, which were again applied. When it was next uncovered, ten days later, it was, as you may see now, an excellent example of what may be termed a pretty stump, and one well calculated to permit of the employment of an artificial limb at no distant date. The highest temperature registered was 100·2° F. Now, when I tell you that this patient had been confined to bed almost continuously for six years, partly on account of angular curvature of the spine, of which she presents a well-marked specimen in the dorsal region, and partly from her sufferings from the affection for which amputation was performed, I think you must agree with me in regarding her progress towards recovery as not a little remarkable, and as I believe that the speedy union which ensued was due to rest, it should encourage you, as it does me, to follow the lines I have mapped out, in the hope that they will lead to complete union under a single dressing even in amputation of the thigh.

There is one point, and that not an unimportant one, which I have not yet spoken of—viz., sutures; and as a large number

of them were required in the case just narrated, this topic may be conveniently referred to now. In this hospital you have seen that my colleagues and I almost invariably make use of catgut sutures in every variety of wound, and this we have found to be a great assistance to us in obtaining early union, for they are absolutely unirritating; and, as I have often shown you, absorption of the part of the threads lying within the wound takes place, a touch with a sponge being sufficient to remove the knots and external portions of the sutures. This use of catgut for sutures as a matter of routine is not universal, for many who have employed them have returned to silk, horse-hair, and metallic sutures, as they state that they have found that absorption takes place too readily. I can only say that that has not been our experience here, for in our hands they have proved perfectly reliable retentive appliances; and as they have been in constant, and almost daily, use for seven years, we have had ample opportunity for forming a just estimate of their value. But in cases where you have a heavy and somewhat unwieldy flap to support, as in Teale's amputation, a few metallic stitches are valuable, and the employment of one or two stitches of relaxation will lend material aid in obtaining accurate coaptation of the deeper parts of the wound by which union will be favoured. The buttons which I now show you are such as I have been in the habit of employing for the latter purpose for the past five years, and as I have every reason to feel satisfied with them, I have not felt inclined to exchange them for any of the more recently suggested ones, for the fastening of the wire is both easy and secure, and tightening and relaxation can be readily achieved. In the case of stitches of relaxation the silver wire should be inserted at a considerable distance from the edges of the wound, and then the free end should be passed through the central opening of the button, and twisted round the little upright knobs which spring from either side of it. I hope to find in chromicised catgut a substitute for the wire, and by using a double thread, its fastening, and its tightening or relaxation if required, will be almost as easily accomplished as if wire were employed.

Before taking leave of the subject of amputations let me remind you that in not a few cases a splint made of sheet lead, or of some material similarly capable of being accurately moulded to the stump, will be found useful in preventing unrest, and will thus prove a valuable adjunct to treatment.

I have already occupied so much time that I must endeavour to compress the three following cases into the smallest compass.

1. Excision of the mamma for soft cancer in a patient aged seventy-three. The operation was performed on Oct. 21.

Tube removed Oct. 25. Line of incision soundly healed Oct. 27. Highest temperature 99·2°.

2. Ogston's operation for genu valgum. Dressing unchanged from first to last. Highest temperature 101·4°.

3. Operation for ununited fracture of tibia in its lower third. This operation, which I was recently called upon to perform in private practice, was a protracted one, occupying upwards of two hours. There was extreme displacement of the lower portion of the tibia, which was overcome with great difficulty after the tendo Achillis and the new structures by which it was connected to the upper portion had been divided. The fibula which had been fractured had united, and this added to the difficulty experienced, but I was unwilling to refracture it, as I was desirous to preserve its integrity in order that it might serve to steady the limb. After much manipulation I succeeded in uniting the ends of the tibia by means of a suture of thick silver wire, having previously removed a piece of bone from both the fractured ends. A drainage-tube was inserted, gauze dressings were applied, and an external plaster-of-Paris splint was employed to prevent movement. The wound was dressed on the following day, and again eight days afterwards. On the latter occasion the line of incision—which was about seven inches in length—showed complete union, and the drainage tube was dispensed with. There was not the slightest sign of inflammation, and the discharge was so trifling that I was doubtful whether I should not re-use the external gauze dressing, which was only slightly stained by it. The patient was perfectly comfortable, and free from pain after the first thirty-six hours had passed, and the only rise in temperature occurred on the evening of the second day, when it was 101·6° F. The dressings were next removed eleven days afterwards, when the protective was coated with moisture, and the opening left on the extraction of the tube was filled with healthy granulations. Three weeks subsequently, when the next exposure took place, the drainage-tube opening was nearly, but not quite, healed, and the same external dressing was again utilised.

What the ultimate result may be, so far as the fracture is concerned, it is as yet too early to foretell; but if we can perform an operation such as this—than which nothing could well be more severe,—and obtain union in the manner which occurred here with only four dressings in a period of nearly six weeks with no pyrexia and almost no pain, I think that we are justified in believing that the *vis medicatrix naturæ* is indeed all potent, and that such means are alone required as will prevent the entrance of baneful influences from without; for I need hardly tell you that in this case the result was in nowise due to the direct or stimulating influence of the carbolic acid on the

tissues, but to the germicidal effects which it exercised upon the putrefactive atoms which no doubt fell upon the dressings in which it was stored. And I would say, in conclusion, that had any such record as I have now laid before you been produced a few years ago, it would have been regarded as a dream that could never be realised, or as a tale only worthy of being included among those of a surgical Munchausen.—*Lancet, Nov.* 12, 1881, *p.* 819.

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## 78.—ON CONTAGIOUS PNEUMONIA.

By Frederick H. Daly, M.D., Hackney Downs.

I wish it to be clearly understood that in giving the above title to this article, I by no means consider it as *proved* that there is a distinct variety of pneumonia which is contagious, say, as measles is contagious. It was necessary, however, to give the paper some title, and the name I have chosen will express what I wish to convey as well as any other I could think of. I start with the admission that the subject is at present *sub judice*. I wish also to be understood as using the word "contagious" as synonymous with "infectious."

Now, let me at once explain what I understand as contagious pneumonia. I do not at all mean septic epidemic pneumonia; I do not mean a blood-poisoning from—say, an insanitary state of a house or neighbourhood; nor yet do I mean the so-called diphtheritic pneumonia. What I am about to discuss is this, whether there exists a variety of pneumonia beginning with rigors and high temperature, and communicable from person to person, as in small pox, measles, and scarlet fever. Having brought forward such evidence as I have at command, I must let the reader form his own opinion as to how far I have proved my case.

I will now briefly refer to my cases. In October 1879, Mrs. H—— consulted me about one of her children who had been unwell for three days. She called at my house to tell me of the child's state, so I did not see the case. She informed me that the child had at first been shivering and sitting over the fire and then got burning hot, and had incessant cough. I prescribed some simple diaphoretic medicine, ordered a linseed poultice to the chest, and directed the mother to send for me the following morning if the child was no better. I was not sent for the next day, but I learned subsequently that the child remained in the same state for several days, and then seemed to get quite well. Nine days after I had prescribed for this child, as above stated, I was urgently summoned to visit two of the other children of this lady. I may remark that she had five children. I found the children in two separate cots in the day nursery. This was

a large and lofty room, having three large windows. The mother had brought them into this room in order that she might herself take charge of them, and not trust them to the care of their nurse. She had also with her in this room the child that had been first taken ill and two others that were apparently quite well. I found the two children that I had been called in to see suffering from acute pneumonia. The elder, a child aged seven years, had consolidation of the left lung from apex to base behind, while in front there was crepitation under the left clavicle, and lower down lung consolidation; there was, in fact, inflammation of the left lung from apex to base, both in front and back. The temperature was 104·2°, rapid pulse, and constant hacking cough. The second child had inflammation of the right base, with a temperature of 103·8°, quick pulse, and incessant cough. I omit all details of these cases. They were typical of acute pneumonia. It is sufficient to state that they both progressed favourably and terminated in seven or eight days in a well-marked crisis, the temperature falling to normal and recovery being complete. I was struck by the remarkable occurrence of two cases of pneumonia simultaneously in the same house, but I had then no suspicion that it was anything more than a coincidence. I had not examined the child that was first taken ill. During the first three days that these children were ill their mother never left them day or night; she had a chair bedstead in the day nursery upon which she slept. On the fourth day of their illness when I called I was informed that the mother herself was taken ill that morning, and had been obliged to go to her own room to bed, and that also her youngest son was very unwell. I found Mrs. H—— in bed. She had had a rigor; her pulse was 126, temperature 104·6°, tongue coated; she was continually coughing, but there was no expectoration, and she complained of a violent pain under the left breast. I could find no physical signs indicative of pneumonia, but had no doubt that that disease was developing itself. I examined the youngest son. His temperature was 105°, and he had acute inflammation of both lungs. He was very ill indeed; on my second visit, in the evening, I thought the child would die during the night. He had consolidation of the left lung behind and in front, and there was fine crepitation at the right base also. I may dismiss this case by saying that, happily, the little patient recovered after a prolonged illness. Indeed, even now he is delicate, and takes cold on the slightest exposure. My attention was now directed to the extraordinary fact, that, in the same house and within a few days, there had occurred in this family four undoubted cases of pneumonia. I now examined the first child that had been seized with illness, and the left lung behind gave, on physical examination, evidence

of recent lung consolidation, and the history of the child's illness, the sudden improvement from being so ill, the fever, the cough, every symptom clearly indicated that this was the first case of pneumonia in the house, and if my hypothesis be correct, the source of the contagion and the starting-point of the four subsequent cases. Let me return now to the case of Mrs. H——. She went on badly; there soon developed fine crepitation all over the left chest behind, and also in front; this passed rapidly into consolidation. Then there was crepitation at the right base, and the temperature continued between 104° and 105°. Dr. Herbert Davies saw this patient in consultation with me. There was at his visit complete dulnesss over the left lung both in front and back, and tubular breathing, also considerable crepitation in the right lung. Her colour was getting bad, the lips slightly blue. She died during the night.

This patient's mother, aged sixty, came to nurse her daughter from Wood-green; she was a remarkably healthy-looking woman. The evening after her daughter's death she was taken suddenly ill. She had a well-marked rigor. I saw her soon afterwards, and her temperature was 105·2°. The next morning there was fine crepitation at both bases, the temperature was 104·8°, and there was great dyspnœa. She continued in much the same state during the day and following night. Dr. Herbert Davies also saw this case with me, and confirmed my diagnosis, as in the former case; but his large and ripe experience was unable to suggest anything which could stay the fatal progress of this case. She began to get livid late in the afternoon, and died in the course of the night—exactly six days after her daughter.

I do not think there can be any doubt that there had been in this house six cases of pneumonia, two proving fatal in about a fortnight. The question now arises, What was the exciting cause of all this disease? What was the starting-point? I confess I was quite at a loss for an explanation. I had never heard then the term contagious pneumonia. But the name at once suggested itself to my mind as conveying the probable etiology of my six cases. I examined the text-books, but could find no mention of such a variety of pneumonia. Even the exhaustive article on this disease in Reynolds's System of Medicine, by Dr. Wilson Fox, afforded me no help in coming to any satisfactory conclusion. It was certain that some of the exciting causes of pneumonia were not present. There had been no chill, as far as I could learn, in any case; nor had there been any prolonged exposure. There was no reason to suppose that the disease was that variety of pneumonia described as epidemic, and which has been associated with general insanitary conditions, such as overcrowding and bad ventilation. The pathogenesis of pneumonia is uncertain, and my cases supported

the theory that this disease is a specific fever, of which the lung disease is only the local effect. My cases exactly resembled, in their mode of attack (case following case) and progress, some zymotic disease, contagious from one patient to another. I wish to make it clear that the sanitary state of the house was most carefully investigated. The drains, the closets, the sink, the cisterns, the water-supply were all completely examined and found in excellent working order, so that there was no common blood-poisoning from any insanitary state of the dwelling. I have before said that the nursery was large and well ventilated; so was the entire house. It is important also to observe how the disease spread. There were three servants in the house; they were but little in the sick rooms; they escaped the disease. The same applies to Mr. H—, while four of the five children that were constantly together all took the disease; so did the mother, who never left them until she herself was seized with the malady, and so also did Mrs. H—'s mother contract the disease, and she was continually at the bedside of her daughter until her death. I ask, then, if this was not contagious pneumonia, what was it? Was it measles without rash? It certainly was not, because, in the first place, there were not present the characteristic catarrhal symptoms, and, secondly, the shortness of the incubation quite negatives measles. Supposing, then, it to be a contagious form of pneumonia, one must directly admit what a rare disease it is. But I do not think we must on this account alone reject such evidence as can be brought forward. Addison's disease is rare; Hodgkin's disease is rare also, and thousands of medical men in extensive practice never see either. Typhus fever is almost unknown to the medical men in this part of London. We do not however, deny that these diseases exist. All that can be said is that the contributing conditions necessary for the production and spread of these diseases, whether in the body or without the body, or both, are rarely present. May we not argue the same with regard to contagious pneumonia? Some special but unknown constitutional predisposition, together with some zymotic influence, may be necessary for the production and propagation of a variety of inflammation of the lungs distinctly contagious. Possibly the disease is often overlooked or mistaken. Everyone knows that there is a bovine disease, pleuropneumonia, which is highly contagious, and which spreads from beast to beast by means of the pus and epithelium cells of the sputa passing into the air-cells of healthy animals. Why may not the same happen occasionally in man? I can see no reason why it may not. A medical friend has called my attention to a paper by Mr. Wynter Blyth, in the Lancet, vol. ii., 1875. It strongly supports my view that there is a conta-

gious form of pneumonia. I must refer the reader to this very interesting paper; I shall, however, make one quotation from it: "A farmer at Bow (North Devon) was affected with acute pneumonia, and was nursed during his illness by his niece. His niece became affected with the same disease and carried it to her husband. In another case, an old man, affected with pneumonia, reposed on an affectionate relative's breast during a great part of his fatal illness. The relative was very shortly afterwards affected with the same ailment." Mr. Blyth relates several such cases which were certainly contagious, and he mentions that Dr. Christian Budd and others have had similar experience. He sums up thus, "So that as scarlet fever determines to the skin, typhoid fever to the bowel, hydrophobia to the spinal cord, the pneumonia germ culminates in the pulmonary tissues." My cases support this view, and I believe that future observations will further confirm it. It is now generally admitted that certain forms of phthisis are contagious. The observations of Dr. Reginald Thompson and others have fairly established this. Dr. Thompson in the Lancet, Nov. 6th, 1880, writes, "Fifteen well-marked examples of this kind (infective phthisis) have come under notice out of something like 15,000 cases of phthisis; hence it is easy to understand why observers with a small number of cases should disbelieve the possibility of contagion." Sir Thomas Watson, in the third edition of his classic work, "The Principles and Practice of Physic," says, "Is phthisis contagious? No, I verily believe it is not." Most men, if asked the same question now respecting pneumonia, would answer in a similar negative. I am inclined, however, to give an affirmative answer to this question with respect to some forms of pneumonia. It was reported in the newspapers last year that Mr. Serjeant Parry had died of acute pneumonia, and within a week his wife, who had nursed him, died of the same disease. Does not this look like contagious pneumonia? I know nothing of the particulars of these cases. I only take the newspaper accounts. Taught by the experience I have gained in the foregoing cases, I believe that I have previously met with cases of contagious pneumonia in my practice, but have not recognised them as such. We know how readily other diseases are conveyed through the naso-respiratory mucous membrane; epidemic influenza, for instance, and this very disease has certainly a tendency to give rise to pneumonia. See, again, how the effluvium from grasses (especially anthoxanthum odoratum) produces summer catarrh or hay fever in many persons. Whooping-cough is also a remarkably contagious disease. I have endeavoured to prove that certain forms of pneumonia may also be contagious; how far I have succeeded I must let others decide. I shall be content if I get men more competent than

I am to direct attention to this subject. We know that certain forms of blood-poisoning can produce pneumonia. Such as albuminuria, erysipelas, and measles most probably. I ask is there still another cause of the disease not generally, if at all, recognised—viz., direct contagion ?—*Lancet, Nov.* 12, *p.* 824.

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## 79.—PHTHISIS AS AN INFECTIOUS DISEASE.

By Alexander M. McAldowie, M.D., Stoke-on-Trent.

A review of the history of medicine shows that attempts have been made from time to time to class pulmonary consumption amongst the infectious diseases. Experiment and theoretical reasoning have been brought forward to prove that the disease is spread chiefly by contagion, whilst the results of clinical study have invariably been directly contradictory to this doctrine. The researches of Wilson Fox, Burdon-Sanderson, and others, which have established the communicability of tuberculosis by inoculation, have not materially altered the opinion of the profession upon the contagiousness of phthisis. This has, however, been recently revived by the powerful advocacy of Professor Cohnheim. Previous to the publication of his paper the prevailing opinion amongst medical men on the subject was expressed by Ruehle as follows :—"Even at the present day it is commonly supposed that the disease may be communicated through the intimate relation existing between husband and wife, and although it is difficult to adduce satisfactory evidence upon the point, we may be permitted to agree with Laennec and Andral, that caution and cleanliness in taking care of and associating with those who are far advanced in consumption are certainly desirable." Dr. Crisp stated several years ago his opinion that it was highly contagious amongst certain of the lower animals. On the other hand, out of a total of 670 cases recorded by Flint, only five show the possibility of the disease being communicated from the husband to the wife, or from the wife to the husband. Flint concludes that "they do not furnish facts sufficient to render the communicability of phthisis probable."

I have, during the past four years, been making observations on over four hundred patients suffering from phthisis treated in the wards of the North Staffordshire Infirmary, on several hundred others attending as out-patients, and on those occurring in private practice, for the purpose of detecting cases in which it was probable that the disease had originated from infection by inhalation. The subject is one which presents peculiar difficulty in investigating, on account of the impossibility, in many cases, of obtaining a correct history of the origin of the malady, or of accepting the patient's

statement as to the presence or absence of tubercular antecedents. I have been able to find four cases where the wife, previously healthy, and with no family history of tubercular disease, became affected whilst attending to her phthisical husband. The ages of the patients in these four cases varied from thirty to forty-four years. All the patients suffered from the tubercular form of phthisis. But the following two cases, where the pneumonic form of consumption appeared to communicate the disease to a healthy person, are worthy of individual record.

P. M., aged eighteen, an ironmonger, always strong and healthy, and with no family history of tubercular disease, was attacked with catarrhal pneumonia after the exposure to cold and wet produced by falling into a river. Rapid phthisis followed, and he died after six months' illness. His brother, eighteen months his junior, who occupied the same bed with the patient till within a few weeks of his death, became affected with tubercular phthisis soon after his decease, and died about three years subsequently. The only remaining member of the family, a brother, two years younger, is at present quite strong and healthy.

A. L., aged forty-six, a bookseller, was attacked with catarrhal pneumonia after exposure to cold. Pneumonic phthisis was afterwards developed, and he died nine months after the commencement of the disease. Before his death his wife exhibited symptoms of pulmonary tuberculosis, to which she succumbed about two years after her husband's death. Both patients had previously enjoyed good health, and in neither case was there any family history of tubercular disease.

With regard to tubercular affections of the abdominal viscera, it is now universally admitted that they may and often do originate from specific germs introduced into the alimentary canal in the same manner as typhoid fever, cholera, and some other infectious diseases. The germs enter the body with the ingesta, and are absorbed by the lymphatic follicles of the small and large intestines, where they exercise their specific effects. The stomach is protected by the acidity of the gastric juice, and the œsophagus by the rapid passage of the food. It being admitted that tuberculosis may be communicated from the diseased to the healthy subject, it remains for us to determine in what manner the system is protected from infection during ordinary intercourse with phthisical patients. The changes of the air effected by respiration take place in the alveoli of the lungs after the air has traversed a complex system of tubes. These are lined by mucous membrane, the surface of which is covered by vibratile ciliary epithelium, and moistened by tenacious mucus which is secreted by mucous glands occupying the spaces between the cartilages, and also, in the larger tubes, the inner

surface of the cartilaginous plates. But when the air has reached the alveoli, physical changes have already taken place during its passage through the bronchi. Professor Lister states:—"I have explained to my own mind the remarkable fact that in simple fracture of the ribs, if the lung be punctured by a fragment, the blood effused into the pleural cavity, though freely mixed with air, undergoes no decomposition. ..... Why air introduced into the pleural cavity through a wounded lung should have such wholly different effects from that entering directly through a wound in the chest was to me a complete mystery until I heard of the germ theory of putrefaction, when it at once occurred to me that it was only natural that air should be filtered of germs by the air passages, one of whose offices is to arrest inhaled particles of dust, and prevent them from entering the air-cells." When particles of carbon are dusted on the mucous membrane of the œsophagus of a frog, we see them propelled towards the stomach by the vibratory action of the cilia. It is probable, then, that any tubercular germs which might be inhaled during close attendance on phthisical patients would in like manner be arrested by the cilia, and removed from the air tubes by expectoration. Although these germs would come in contact with the mucous membrane of the bronchi and trachea, the chances of their absorption would be slight. Lymphatic vessels are abundant, especially on the internal layer of the bronchi, but there are no lymphatic follicles as in the intestinal mucous membrane. That the trachea and bronchi are not readily attacked by tubercular matter is evident from the comparative rarity with which tubercular ulceration of their lining membrane is found during the early stages of consumption. Moreover, Morrell McKenzie, in speaking, of laryngeal phthisis, states decidedly that it is not due to the corrosive action of the sputa. Animals indeed, are readily rendered tuberculous by the forcible inhalation of tubercular sputa in spray. The motor power of the cilia has also been forcibly overcome by the inhalation of an atmosphere highly charged with carbonaceous particles. But it is impossible that a concentrated atmosphere of tubercular germs, such as are used during these experiments, should be met with in ordinary contact with consumptive patients. Further, the germs which float in the air are not moist, as in the above experiments, and it is well known that the infective power of dry germs is feeble compared with that of moist. The lungs are liable to infection only when the inhaled germs have escaped the filtering action of the bronchi and reached the air-cells. Here they come in contact with a surface highly favourable for their absorption. The lymphatics of the alveoli commence in small anastomosing lacunæ destitute of proper coats, situated in the fibrous alveolar wall;

the larger trunks run in the direction of the elastic fibres, and subsequently follow the course of the capillaries, yet not so strictly but that they frequently cross the latter, and form large lacunæ in their meshes (Schulze). The columnar ciliated epithelium which lines the bronchi is here replaced by a layer of cubical non-ciliated cells. The absorptive power possessed by the air-cells of the lungs is great, and has only been thoroughly recognised of late years. I have seen a pneumonic exudation, which occupied the whole of the lower lobe of the left lung, entirely removed by absorption in six days, only two or three drachms having been removed by expectoration. The parts of the alveoli most exposed to the attack of inhaled germs are those near the entrance, at the points where the small bronchial tubes lose their cylindrical character and become covered on all sides with the cells. And pathological observation has proved that these are frequent starting-points in phthisis. Rindfleisch states, "The first lesion in pulmonary phthisis is a tuberculous infiltration of all the angles and projections situated at the points where the smallest bronchioles become continuous with the acini. In this way circumscribed white nodules are formed, which we will call, after Laennec, tubercle granula." It is conceivable that the development of these tubercle granula is due to the transmission of infective germs by the bronchi during inspiration, and that the germs may be inspired during intercourse with consumptive patients, or from other parts of the lungs in those already affected with phthisis.

The special liability of the apices of the lungs to tubercular disease is not opposed to the theory of infection by inhalation. Pulmonary diseases which are produced by inhalation of dust invariably begin in the upper and posterior parts of the lungs as the air first enters these portions during inspiration. The inspired particles are therefore more likely to reach the alveoli than in other parts of the lungs. Moreover, as Ruehle remarks, owing to the anatomical peculiarity of the apex, forcible expirations drive the air into this part, and anything which has found its way into the bronchioles of this region has less prospect of escape and more of retention, decay, and decomposition than in other parts of the organ.—*Lancet, Nov.* 12, *p.* 825.

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## 80.—ON ELECTRO-DIAGNOSIS.

By John Dixon Mann, M.D., M.R.C.P., Manchester.

The rapid progress recently made in the pathology of diseases affecting the nervous system, by demonstrating the relation between organic lesions and the resulting train of symptoms, has greatly enlarged the field of diagnosis, and has developed

the use of systematic methods of investigating the physical conditions to which such diseases give rise. In seeking to ascertain the essential nature of a neurosis, many methods are used to test the functional activity of the affected muscles and nerves; and, by comparing the results with those obtained from an examination of corresponding and healthy structures, to localise the casual lesion, and to gauge its intensity. In investigations of this kind, much information is derived from comparative observations of the immediate effects produced by electricity on nerve and muscle, in health and in disease. The diagnostic powers of electricity are largely used by those specially engaged in the treatment of diseases of the nervous system; but, owing to an exaggerated estimation of the technical skill required for its practice, electro-diagnosis has not yet received the general attention due to its importance. The time approaches when the diagnosis of many diseases of the nervous system, hitherto considered obscure, will be a matter of ordinary routine; every practitioner, therefore, should be conversant with all the recognised methods of investigation.

The application of the constant, or voltaic current, to a healthy muscle, produces contraction only at the opening and at the closure of the circuit—that is, at the moment the current begins, and at the moment it ceases to flow; whilst the current is flowing, the muscle is passive. Different degrees of current-strength are required to evoke muscular contraction, in accordance with the fourfold manner in which the contraction may be produced —namely: at the closure of the circuit, and at its opening, with either the positive or negative pole. Beginning with a mild current, and gradually increasing it, the first normal reaction which occurs is that produced by making contact with the negative electrode—cathodal closure contraction (C. C. C.). Next comes the contraction produced by breaking contact with the positive electrode—anodal opening contraction (A. O. C.). Almost synchronous with the last is the anodal closure contraction (A. C. C.); and, last of all, requiring a most powerful current, is the cathodal opening contraction (C. O. C.). When the current is very strong, the cathodal closure contraction assumes a tetanic character; if the current be still further augmented, the anodal closure contraction evinces a like tendency. The diagnostic value of these reactions is derived from certain changes produced in their amount, order, and character, by different forms of motor paralysis. For the purposes of electro-diagnosis, paralyses may be divided into two primary divisions: 1. The electrical reactions are unaltered; 2. The electrical reactions deviate from the normal. The last division is subdivided into: (*a*) cases where electro-irritability undergoes simple increase; (*b*) cases where electro-irritability undergoes simple

decrease; (*c*) cases where qualitative, as well as quantitative, changes occur.

1. Paralyses in which *electro-irritability is unaltered.* Cerebral: from apoplexy, embolism, or tumours. Spinal: from chronic myelitis. Peripheral: rheumatic, slight facial, and slight traumatic paralysis.

2. (*a*) Where there is *simple increase of electro-irritability.* (This deviation is of rare occurrence). In the early stage of hemiplegia, in locomotor ataxy, and in the early stage of some peripheral paralyses, *ex. gr.*, facial paralysis.

(*b*) Where there is *simple diminution of electro-irritability* (more frequent than the last). In bulbar paralysis (rare); in spinal paralysis, accompanied with muscular atrophy; in progressive muscular atrophy.

(*c*) Where there are *qualitative, as well as quantitative, alterations in electro-irritability*, called by Erb "the reaction of degeneration." This deviation is characterised by quantitative changes in the electro-irritability of nerves, and in the farado-irritability of muscles; and by both quantitative and qualitative changes in the volto-irritability of muscles. The following is an epitome of the changes produced by an acute attack of average intensity. About the third day after the onset of the paralysis, there is diminution in the electro-irritability (faradic and voltaic) of the nerve; about the twelfth day, it is entirely lost. In cases of recovery, nerve electro-irritability gradually returns. The farado-irritability of muscles also diminishes, and eventually disappears. The volto-irritability of muscles falls during the first week; but, in the second week, it undergoes a remarkable increase and qualitative change. The feeblest current, slowly interrupted, produces a sluggish contraction, differing from the rapid movement of healthy muscle; a state of muscular tonus, more or less marked, persists as long as the current flows; rapid interruptions, even with a powerful current, fail to produce any muscular reaction. The anodal closure contraction equals, and occasionally exceeds, cathodal closure contraction; and cathodal opening contraction tends to equal, or surpass, anodal opening contraction. After a variable period, the opening contractions disappear, and the volto-muscular irritability diminishes (in cases of non-recovery) progressively to extinction. The inverted order of the reactions persists to the end; the last contraction is that caused by anodal closure. In cases of recovery, when a certain stage of diminished irritability is reached, regeneration sets in, and is followed by a rise of volto-irritability towards the normal. The improvement in muscular volto-irritability, and the restoration of the other normal faradic and voltaic reactions, do not take place until after the return of motility. These changes in electrical reaction are due

to degeneration of the intramuscular nerve-fibres, and to certain histological changes undergone by the minute muscular structures. The stage of degeneration may be deduced from the degree of abnormal reaction present; when the reactions tend to resume their normal order and character, regeneration has commenced. The following paralyses are attended by the reaction of degeneration: severe traumatic paralyses; paralyses produced by pressure on a nerve, sufficiently severe as seriously to interfere with the performance of its functions; acute poliomyelitis anterior (infantile paralysis); hæmatomyelia; medullary paralysis; progressive muscular atrophy; and saturnine paralysis.

For the practice of ordinary electro-diagnosis, the disk electrodes, supplied with medical batteries, suffice; much more delicate reactions, however, may be obtained by the use of small olivary electrodes furnished with current-interruptors, by which the circuit can be closed and opened without changing the position of the electrodes. A pedal interruptor is a convenient accessory for producing slow interruptions with the induction apparatus. The following conditions are to be observed. The patient should be placed in a well diffused light; the limbs under observation should be arranged symmetrically, in an unconstrained position; and the patient should allow the muscles to be perfectly passive. If the paralysis be unilateral, care should be taken to apply the current equally to the two sides, both as regards strength and localisation.

As an illustration of the method employed in the practice of electro-diagnosis in its simplest form, take a case of infantile paralysis of one limb—say, the arm—a few weeks after the subsidence of the acute stage. Place a flat disk electrode, connected with one battery terminal, on the cervical spine, and fix it there. To the other battery terminal, by means of a double or branched conducting cord, attach two small electrodes, with current-interruptors; and, having selected a muscle, place the electrodes on corresponding points on the two arms. See that the electrode covers are well moistened with water, acidulated with a few drops of acetic acid; and, if the skin be very dry, pass over the arms and neck a sponge squeezed out of hot water. Let an induced current first be used. Complete the circuit with the interruptor on the sound arm, and gradually increase the current-strength until a well-marked contraction is produced; now, try the effect on the paralysed limb: there is no response. If the current-strength be increased to the highest bearable limit, and the interruptions be made to succeed each other very slowly, still there is no manifestation of faradic irritability. Change the induced for the constant current;

commence with the paralysed limb; and, by means of the battery commutator, make the electrodes applied to the arms alternately positive and negative; add cell after cell, opening and closing the circuit, with the interruptor, several times after each addition to the current-strength, until a slight muscular contraction is seen; this is first produced, probably, by closing the circuit with the anode, though in many cases it is not easy to decide the priority of A. C. C. over C. C. C. If the same current-strength be now applied to the healthy limb, no reaction is perceived. As previously stated, the volto-irritability of the paralysed muscles is exalted at this stage; a much weaker current suffices to evoke contractions in them than is required in the case of healthy muscles. If the current-strength be increased until the opening contractions are produced in the paralysed limb, it will be found that C. O. C. is coetaneous with, if it do not precede, A. O. C. A medium current, producing, with slow interruptions, well-marked contractions of the affected muscles, with rapidly succeeding interruptions, fails to produce any muscular reaction. When the paralysis is paraplegic, there is obviously no opportunity of comparing the diseased muscles with the corresponding muscles of the opposite limb; in such cases, experience is the only guide. The operator must, therefore, draw upon his memory for the requisite data wherewith to make comparison.

In cases of partial motor paralysis, especially when restricted to isolated muscles, a more minute investigation is required. The localisation of the electrodes must absolutely correspond on the healthy and on the diseased limbs; more than one examination will probably be necessary for the formation of a reliable opinion.—*British Medical Journal, July* 16, 1881, *p.* 78.

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## 81.—ON A CASE OF BELLADONNA POISONING TREATED WITH PILOCARPIN.

By Nicholas Grattan, L.R.C.P.E., Surgeon to the County and City of Cork Hospital for Women and Children.

The subject of the "antagonism of therapeutic agents" has of late been brought so prominently before the profession that the notes of the following case will probably be read with interest.

Mrs. M——, aged forty-two, drank by mistake a wine-glassful of a liniment at 9 p.m., on Dec. 23rd, 1880. Fortunately for her, she had had a hearty dinner about four hours before. She discovered her mistake, and took two teaspoonfuls of mustard in water, with no effect. She walked a short distance into town, purchased an emetic, which she drank, returned home, felt dizzy, her sight going, shadows before her eyes, lost

the power of speech, became greatly excited, had convulsions, and vomited slightly, and then lapsed into profound stupor. At 10.45 p.m. I saw her for the first time. Her pupils were widely dilated, not acted on by light; her face was swollen, and of a bluish colour, more especially her lower lip, the mucous membrane of which appeared as if it had been blistered; the pulse was imperceptible in one wrist, almost so in the other; respiration 25. I introduced a stomach-tube, pumped in mustard emetic and washed out the stomach thoroughly. In half an hour she had vomited freely, sensibility was slightly returning, but she soon lapsed into complete stupor. From this time until 2 a.m. she was treated with cold affusion to the head, and flagellation with a wet towel over the heart. At 2 a.m. I learned from my friend Dr. Harvey (for whom I had sent, as he had ordered the liniment for Mrs. M—— at the dispensary) that she had taken ℥ii. ʒ ii. of lin. belladonna. (B.P.). There being no decided improvement in her condition I determined to try pilocarpin; this I procured at 3 a.m. and subcutaneously injected one-fifth of a grain every fifteen minutes. After the third dose there was a marked improvement; consciousness was evidently returning, her countenance became more natural, her pulse could be distinctly felt, and she was able to raise her hands to her mouth and throat. At 3.45 I administered a fourth dose of one-fifth of a grain; this had a decided effect on both pupils, which began to contract under the influence of light; she was evidently fast recovering; had a drink of tea and milk and was able to speak. At 4.30 a.m. she was so far recovered that I thought it safe to leave her, desiring her friends to send for me should she relapse into her former state. When I saw her again at 10 a.m. she had had a refreshing sleep, from which she awoke saying that she did not remember anything that had occurred. She had had in all four-fifths of a grain of pilocarpin; it appeared to act as a direct antidote to the belladonna and did not cause the least perspiration. She continued to feel slight dizziness for two days with dilated pupils, but was in every other respect quite well. I gave her half a drachm of tincture of opium each night. The third day she had perfectly recovered.—*Lancet*, *June* 11, 1881, *p.* 951.

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## 82.—ON THE USE OF MALT EXTRACTS.

By J. Milner Fothergill, M.D., London.

Preparations of malt are now being very extensively used, and are largely advertised by their proprietors. If the directions upon the labels of some preparations are to be taken as a criterion of the ideas prevalent on the matter, the use of malt extracts is, at the present time, somewhat haphazard. This is very unde-

sirable in the interests of all. The patient is not improved, the medical man is dissatisfied; while the preparation is depreciated, often from no fault of its own. Under these circumstances a few words may not be out of place as to what may fairly be expected from a good malt extract; and what precautions must be observed in order to secure its utmost usefulness.

The starch of our food is converted by the ferment of our saliva into sugar, or a soluble matter half-way betwixt starch and sugar, known as dextrine. Starch as starch is insoluble, and therefore requires to be rendered soluble in the digestive act, in order that it may pass from the alimentary canal into the blood. The ferment of the saliva is known as diastase. By its action a great portion of the starch of our food is digested, or made soluble. What starch is left over undigested by the salivary diastase in the stomach undergoes no change there; but is acted upon by the diastase of the pancreas after it has passed out of the stomach. Diastase, whether salivary or pancreatic, is only active in an alkaline medium, and is killed by an acid. Consequently, the digestive act in the stomach does not affect the digestion of starch. It is essential to have clear views upon the subject.

When the salivary diastase is brought into contact with starch in the mouth, the transformation commences. The starch so rendered soluble readily passes through the walls of the stomach, and so does not impede gastric digestion. But when the salivary diastase is imperfect, then a quantity of undigested starch harrasses, and hampers the digestive act in the stomach. It then becomes desirable to improve the digestion of starch by resort to an artificial digestive agent; and for this purpose we use an extract of malt.

The chemical change brought about in the act of malting, is the conversion of the starch of the barley into sugar and dextrine, soluble matters capable of being converted into alcohol and carbonic acid under the influence of yeast, in the process of brewing. Pereira, in his great work, published in 1850, wrote—"*Malt*. This is barley which has been made to germinate by moisture and warmth, and afterwards dried, by which the vitality of the seed is destroyed. By this process part of the proteine matter of the barley is converted into *diastase*. This, although it does not constitute more than 1-500th of the malt, serves to effect the conversion of about 40 per cent. of the starch of the seed into grape sugar, or *gum* (dextrine)." The seed of barley contains then a quantity of diastase, which in the act of germination is converted into dextrine and sugar, for the nutrition of the embryo-plant until it can feed itself. The parent plant stores up food for its offspring in the form of insoluble starch; and, along with it, a ferment, which transforms insoluble starch into soluble sugar for the use

of the plant in the act of germination. How the brewer or maltster came upon the matter is unknown. When the physiological chemist found that starch was transformed into dextrine and sugar by diastase in human saliva, the step forward to the use of vegetable diastase was not a long one to take.

To utilise the digestive ferment of the embryo-plant for the necessities of the human infant, was a step forward in the treatment of defective nutrition. But certain cautions must be observed in such use of vegetable diastase, else it is rendered inutile and inoperative. It must be so used as to supplement the natural diastase of the saliva. When cooked starch is eaten salivary diastase acts quickly upon it, and liquefies it. This is accomplished in a very brief time, viz., while the food is in the mouth, while it is passing down the gullet, and in the stomach before the contents of the stomach become acid. "When a meal is swallowed it takes some time for the gastric juice to permeate the mass, and the acidity of the gastric contents is for some time feeble" (Wm. Roberts). Consequently, we see the proper time to give vegetable diastase, as malt extract, is not "immediately after a meal," as some labels direct; for then the acidity of gastric digestion is at its height, and the diastase would at once be killed. It should be given so as to be operative before the stomach becomes distinctly acid.

The old rule of giving children "pudding before meat" is thus seen to be a wise one. The farina was acted upon by the salivary diastase before the stomach became acid; while the acid medium was favourable to the digestion of the albuminoids of the meat which followed. Now the plan is to make the pudding follow the meat, so that the farinaceous food finds the stomach highly acid when it reaches it, and consequently the time allowed for the salivary digestion of starch is too short to be effective: while a quantity of undigested starch in the stomach interferes with the digestive act therein. Farinaceous food should then form the first part of a meal for children, dyspeptics, and invalids.

Now, in order to secure all the advantages which can possibly be derived from malt extracts, it is necessary to follow Nature's processes, not to traverse them. Consequently, malt extract should be taken either (1) with farinaceous food; or (2) immediately after such food. For the first it is admirably adapted by its properties, being sweet and toothsome, so that it can be added to farinaceous messes, with or without milk, previous to their being eaten. One caution is, however, necessary, and that is it should not be added until the mess has so far cooled that it can be sipped. This is Dr. Roberts's rule ("On the Digestive Ferments.") Diastase is killed by a temperature of 147° F., and this is the lowest temperature at which anything can be

sipped. Consequently, when the food has become so cool that the nurse can sip it, then the malt extract may be added. It could either be mixed throughout the farinaceous matter, or eaten with it; as the case may be, according to the nature of the food. Or it could be taken immediately after the farinaceous food has been swallowed, so as to operate before the stomach has become too highly acid.

Such then is the proper use of malt extracts in order to secure the full action of the diastase contained in them.

In order to secure the action of vegetable diastase it is necessary to use a preparation of malt extract which has not been heated to more than 140° Fahr., in its manufacture. Some malt extracts are raised to the boiling point in their preparation, and such are rendered useless as artificial digestive agents, because their diastase has been killed by so doing.

Beyond such use as an artificial digester of farina or starch malt extracts have a lesser utility. They contain the phosphates of the grain, and a certain portion of the starch transformed into sugar or dextrine; consequently they are highly nutritive. They can thus advantageously be added to milk either for invalids, or dyspeptics, or for young infants whose salivary digestion of starch is either only developing, or is imperfectly developed. "In the human infant diastase does not appear to exist in sufficient abundance to digest starchy matters effectively until about the sixth or seventh month. Until this period it is therefore not advisable to administer farinaceous food to infants."—(W. Roberts.) It would, then, be well to commence about the sixth month to add a little malt extract to the milk previous to the use of ordinary prepared starch foods.

As a beverage malt extracts may be taken with effervescing water. A little malt extract in a tumbler half filled with milk, and then filled up with effervescing water as from a syphon or gazogene, would form an admirable sustaining drink in hot weather, or when fatigued; or it might be taken a couple of hours after a meal by those whose assimilation is defective, and who dislike cod-liver oil; with decided advantages in many cases.

These, however, are but minor uses of malt extracts compared to their utility as aids to the natural digestion of starch by the diastase of the saliva. They are largely adapted for children, but there exists no reason why they should not be more largely given to adults, for whom they will be found equally serviceable.

In all wasting diseases, whether medical or surgical, malt extracts are indicated from their nutritive properties; and some of them also as aiding in the digestion of farinaceous matters.—*Medical Press and Circular, Oct.* 12, 1881, *p.* 313.

## 83.—ON THE ADVANTAGES AND DISADVANTAGES OF ETHER AND CHLOROFORM.

By J. W. Browne, M.D., Surgeon to Belfast Royal Hospital.

*Advantages of Chloroform.*—In most cases its administration is agreeable to the patient; rapid in its action; complete insensibility produced; the entire absence of excitement when the insensibility is complete; little laryngeal or bronchial irritation; the easy maintenance of the anæsthetic influence, and less liability to cause vomiting.

*Disadvantage* is said to be the risk attending its administration. Death from the inhalation of chloroform may result, and probably does often result, from gradual paralysis of the respiratory muscles from the effects of the chloroform upon the respiratory centres.

There is another form of death from chloroform—cardiac syncope—the heart at one moment beating well, and the next moment stops. So that you see chloroform may cause death not only by arresting respiration, but also by its depressing action on the heart—this action on the heart being, in my opinion, the greatest disadvantage of chloroform, because when the respiratory centres are affected we can watch the change of breathing from its comparatively calm state, gradually becoming more shallow and stertorous; here by following out certain rules danger can be averted. But when death takes place from cardiac syncope, here there is no warning, the time between life and death being almost absent; so that, granting this cardiac syncope to be a serious disadvantage to the use of chloroform, we must take every precaution, before commencing the administration, to limit the risk, by placing the patient in the recumbent posture, and attending to the other well-known details.

*Advantages of Ether.*—It is said that all records show it to be safer than chloroform—that is a matter of opinion. To my mind the greatest advantage of ether over chloroform which can be presented is, that although ether, like chloroform, may kill by arresting respiration, it does not destroy life by its depressing action on the heart—*i.e.*, it does not kill by cardiac syncope.

*Disadvantages of Ether.*—It is an unpleasant anæsthetic; it requires a long time to effect complete unconsciousness. The time required to get the full effect of the ether varies to a far greater extent with different people than in the case of chloroform. As a rule, it is twice as long, the quantity requiring to be inhaled being much greater. Other disadvantages are the restless excitement that often results from its administration, very different to the extreme quiet of chloroform unconsciousness; also the danger of ether vapour catching fire should any

light be placed incautiously near the patient's mouth during inhalation. Dr. Neligan mentions, as one of the disadvantages, the persistent taste and odour experienced even for days by those to whom it has been administered; and Mr. Clover has drawn attention to the fact that the flow of saliva is considerably increased during the administration of ether and occasionally gives trouble.

My opinion is that ether does not hold so good a position in the scale of safety as it did a very few years ago. I remember some six years since nothing but ether was administered at several English and Irish hospitals I visited, and I was very much surprised to find three weeks since, whilst revisiting these hospitals, either chloroform in use or a mixture of ether and chloroform. I dare say you are aware that up to 1872 Mr. Spencer Wells used ether largely, and that he now either uses chloroform or bichloride of methylene. At the Samaritan Hospital for Women, London, I had the pleasure and advantage of seeing a few ovariotomies performed. Here the anæsthetic used was chloroform administered by Junker's inhaler; and from conversations I had with several medical men just returned from the great medical schools of the continent, I learned chloroform is the anæsthetic chiefly used.

"In Germany, chloroform has a less disputed sway than in any other country, and is now, according to Dr. Kappeler, of Germany, so far as he knows, exclusively used. In Austria the course pursued by Billroth is an index of the lack of full satisfaction with either ether or chloroform." He is an advocate of, and constantly uses, a mixture consisting of three parts of chloroform, one part of ether, and one part of alcohol. This is the mixture which was so strongly recommended by the Committee of the Medico-Chirurgical Society.

In threatened death from chloroform the means which we most frequently rely upon are—(1) Drawing forwards the tongue with tongue-forceps; this method was first introduced by Mr. Lister, but it is now considered you gain more by drawing forwards the inferior maxilla; by so doing the muscles which connect the lower jaw with the larynx and os hyoides are drawn upon and open the larynx. It is said you gain a freer opening of the larynx by this method; at the same time as you draw forward the tongue or lower jaw it is recommended to place the patient upon his left side. (2) Nélaton's plan:—Inverting the patient so as to lower the head and determine a flow of blood to the brain. (3) Artificial respiration, by Sylvester's, Marshall Hall's, or Howard's methods.—When practising artificial respiration you can place a sponge saturated with hot water over the heart. This is recommended by Dr. M'Leod, of Glasgow.

The medicinal agent which seems to promise most as an antidote to chloroform and ether poisoning is the nitrite of amyl, since physiological experiments have developed an antagonism between the effects of nitrite of amyl and chloroform. While chloroform impairs reflex excitability and produces contraction of the cerebral vessels, nitrate of amyl restores this excitability and causes their dilatation. Into the enlarged vessels the blood freely enters, and a rapid circulation follows. —*Dublin Journal of Med. Science, May, p.* 453.

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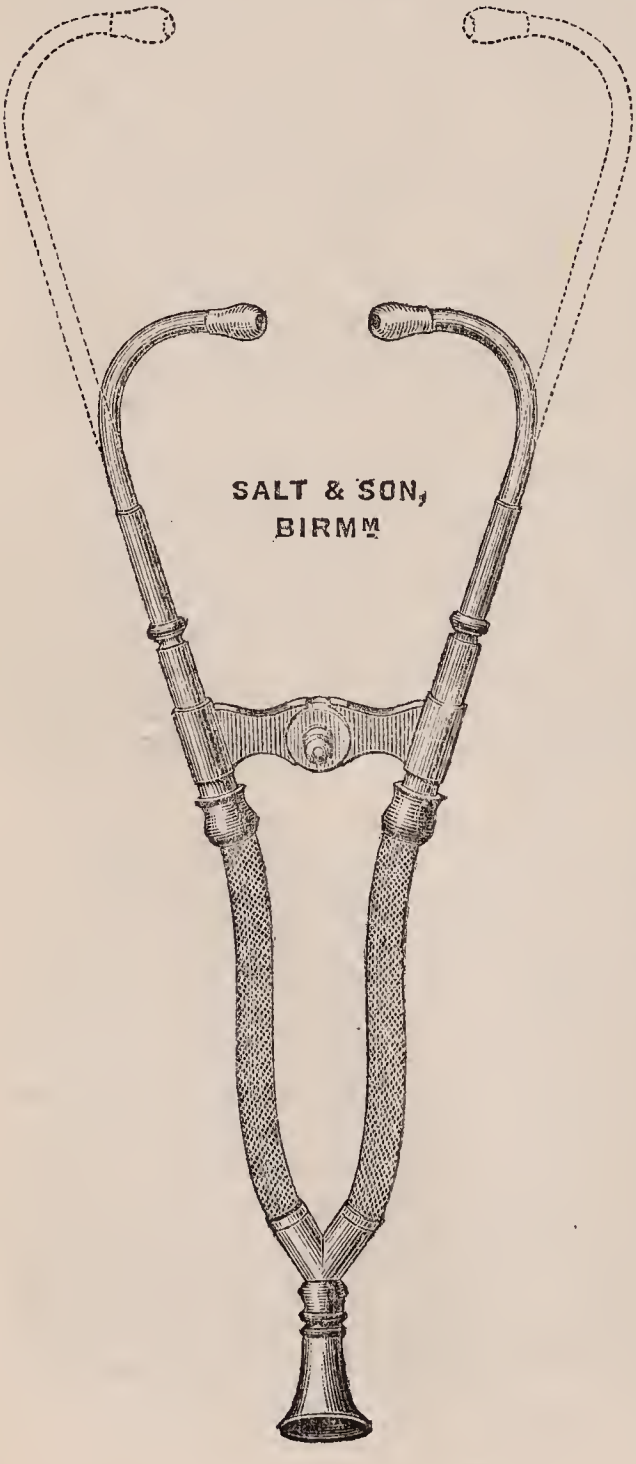
## 84.—SALT & SON'S IMPROVED BI-AURAL STETHOSCOPE.




This Stethoscope is a modification of the instrument in general use, the improvement consisting in the adaptation of sliding tubes to the metallic parts of the instrument, whereby its inconvenient length is considerably reduced, stability being secured in use by a bayonet lock-action turning to the right.

The Stethoscope thus designed becomes, as it was not before, a portable instrument, and this without detriment to its acoustic properties;—the dotted lines on the woodcut show the varied positions of the tubes.

Messrs. Salt & Son, of Bull Street, Birmingham are the designers and makers.

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